SIMATIC ET 200
for Distributed Automation Solutions

Brochure • November 2007

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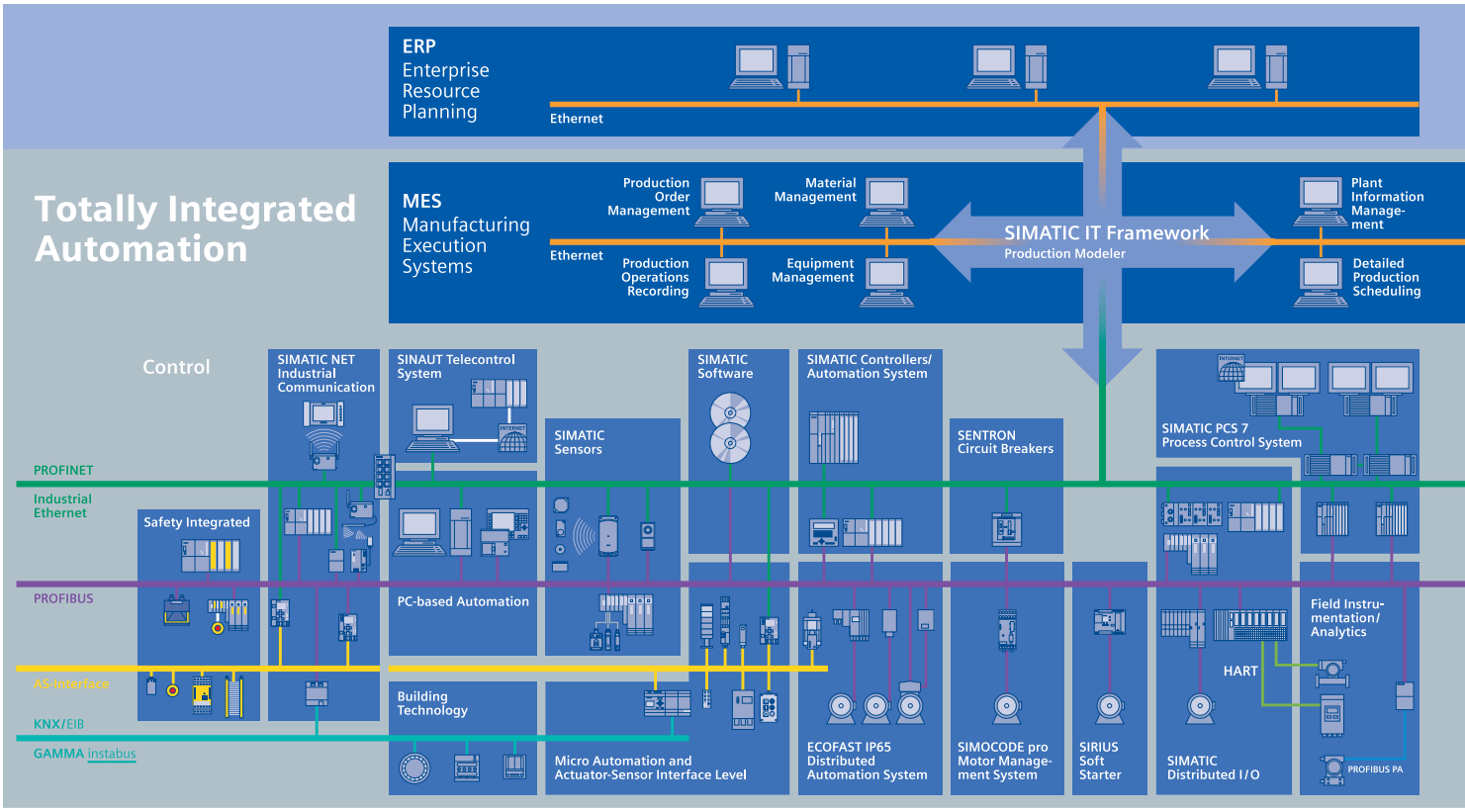
Increase your competitiveness with Totally Integrated Automation

To be able to respond to the increasing international competitive pressure, it is more important than ever that you focus on the core competencies of your company. The medium-term and long-term strategic focus on innovative automation concepts will be a key factor that helps you achieve sustained success.

Siemens offers the ideal basis for this purpose – Totally Integrated Automation (TIA) – for all sectors, from incoming to outgoing logistics. Thanks to the unique integration of TIA you can take advantage of the unrivalled interaction of all of our products and systems – even across different versions. Thus you protect your investments and simultaneously take advantage of future developments.



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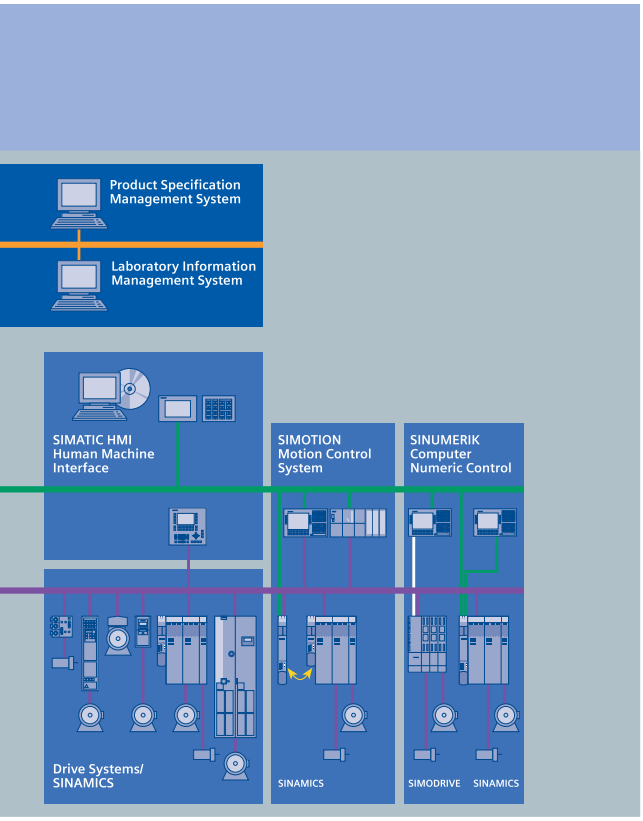
SIMATIC is a core part of Totally Integrated Automation and its range includes numerous standardized products and systems – such as the distributed I/O systems SIMATIC ET 200 presented in this brochure. Whether you need a solution with control cabinet or without control cabinet: Our complete range of I/O systems covers solutions for all application areas – and offers the performance capability and flexibility you need.



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Distributed automation
The right solution for any requirement

You are constantly on the look out for possibilities of optimizing production and reducing costs? With increasing competition it is essential to provide individual machinery and plants as fast and cost-effectively as possible? This starts with the design of your machine and continues through installation, commissioning and normal operation right up to maintenance.

Uniform engineering, comprehensive functionality, simple installation and high-precision diagnostics from any point in the plant are essential – and it all needs to be based on international standards.

Ahead of the competition thanks to consistent decentralization

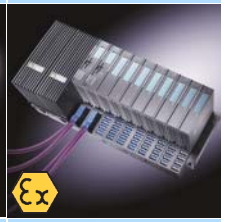
Flexible, distributed solutions are an essential part of modern automation – solutions that are tailored to your requirements and permit significant cost savings. Whether compact or modular, purely digital I/O interfaces or complete distributed systems with drive technology, installed in the control cabinet or directly in harsh industrial environments.

SIMATIC ET 200 –
offers the right solution for every application

With SIMATIC ET 200 a wide range of distributed I/O systems is available – for solutions in the control cabinet or without a control cabinet directly at the machine, as well as for applications in hazardous areas. The modular configuration allows the ET 200 systems to be configured or expanded in small steps. Ready-to-use, integrated add-on modules reduce the costs and offer a wide range of different application possibilities.

A wide variety of combinations is available: Digital and analog inputs and outputs, intelligent modules with CPU functionality, safety systems, motor starters, pneumatic devices, frequency converters as well as various different technology modules (e.g. for counting, positioning).

Communication over PROFIBUS and PROFINET, uniform engineering, transparent diagnostic possibilities as well as optimal interfacing to SIMATIC controllers and HMI units prove the unique integration of Totally Integrated Automation.

In a control cabinet (IP20)		
Multifunctional	**Compact and expandable**	**Block**
ET 200S	ET 200S COMPACT	ET 200L
Modular	**Intrinsically-safe**	
		
ET 200M	ET 200iSP	

Without a control cabinet (IP65/67)		
Multifunctional	**Block**	**Robot**
ET 200pro	ET 200eco	ET 200R

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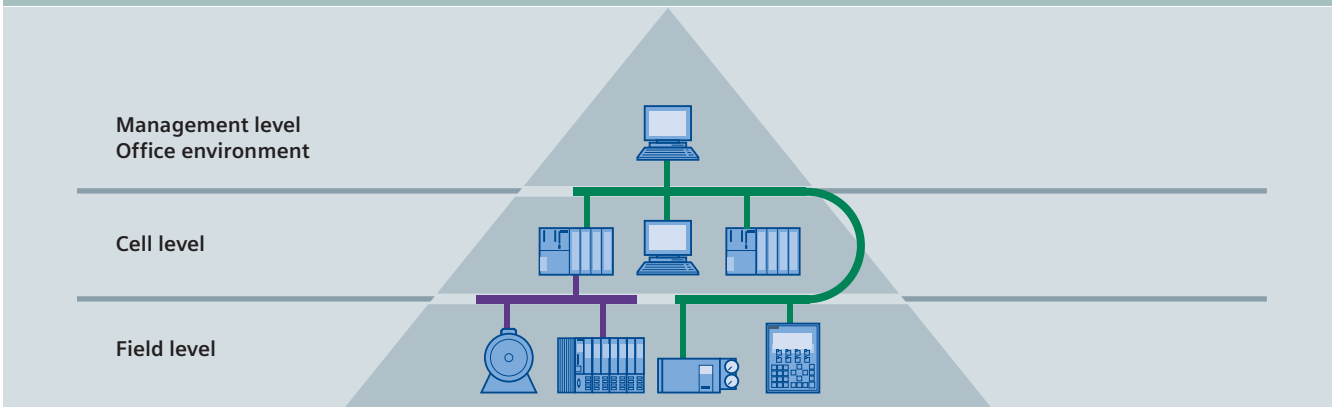
Distributed fieldbus systems are elementary components of the automation landscape. Communication is performed at the field level with PROFIBUS and PROFINET – these systems ensure rapid data transfer between the components and consistent decentralization of the automation solution.

The use of open communication standards offers flexible connection possibilities – whichever system you decide on. You also have flexibility with the ET 200 systems – most systems communicate both over PROFIBUS and PROFINET.

Dezentrale Feldbussysteme



PROFIBUS

PROFIBUS is the No. 1 fieldbus – the proof lies in the 20 million nodes installed worldwide.
PROFIBUS is not only implemented in the manufacturing area, but it can also be used throughout the process industry – even in hazardous areas. Standard interfaces support quick and easy connection of the I/O to your systems and therefore integrated communication from the cell level down to the field level.

PROFINET

Company-wide automation with PROFINET:
PROFINET – the open Industrial Ethernet Standard for automation – ensures integrated communication. Existing fieldbus systems can be easily integrated. This protects your investments for the future. With PROFINET, the established IT services (e.g. web services, remote services, TCP/IP communication) can be used easily. PROFINET offers innovative diagnostics options, extended quantity structures and high performance and supports new user-friendly applications, e.g. wireless automation with Industrial Wireless LAN.

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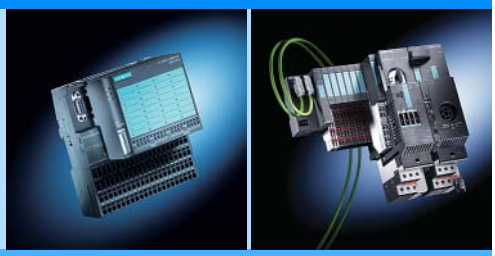
Product range at a glance

Solutions in a control cabinet (IP20)

SIMATIC ET 200S –
The multitalent with a comprehensive range of functions

- Bit-modular design with multi-conductor connection
- Multifunctional thanks to a wide range of modules: Motor starters, freq. converters, safety technology, distributed intelligence, IQ-Sense modules.
- Use in hazardous areas (Zone 2)
- Also available as expandable block version with integral DI/DO: SIMATIC ET 200S COMPACT



SIMATIC ET 200M –
The multi-channel S7-300

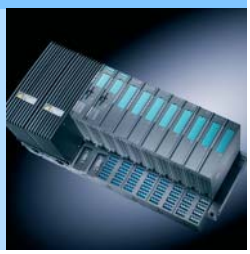
- Modular design using standard SIMATIC S7-300 modules; redundant design also possible
- Fail-safe I/O modules
- For use in hazardous areas up to Zone 2, sensors and actuators up to Zone 1.
- High plant availability thanks to redundancy, hot swapping, and configuration changes in running operation

SIMATIC ET 200L –
Digital block I/O

- Low-cost digital block I/O
- Digital electronic blocks of up to 32 channels

SIMATIC ET 200iSP –
The intrinsically-safe version for hazardous areas

- Modular design, also available with redundancy
- Rugged, intrinsically-safe design
- Use in hazardous areas up to Zone 1/21, sensors and actuators may even be located in Zone 0/20
- High plant availability thanks to redundancy, hot swapping, and configuration changes in running operation



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Solutions without a control cabinet (IP65/67)

SIMATIC ET 200 systems

For installation without a control cabinet

SIMATIC ET 200 systems for cabinet-free configurations are installed in a rugged, fiber-glass strengthened plastic casing, making them resistant to shock and dirt, as well as watertight. You need fewer additional components, save on cabling and profit from the fastest response times.

For information on degrees of protection, see page 44.

SIMATIC ET 200pro –

Modular and multi-functional

- Modular design with an extremely compact casing (small footprint)
- Easy installation
- Multifunctional thanks to a wide range of modules – from simple inputs and outputs through safety systems, motor starters and frequency converters to the MOBY identification system
- High plant availability thanks to hot swapping and permanent wiring
- Extensive diagnostics

SIMATIC ET 200eco –

Digital block I/O

- Low-cost digital block I/O
- Flexible connection options
- Fail-safe modules
- High plant availability – The electronic block can be easily replaced during operation without any interruption in the bus communication or power supply

SIMATIC ET 200R –

The solution for robots

- Specially for use on robots, e.g. in body-in-white assembly in the automobile industry
- Mounted directly on the chassis
- Resistant to weld spatter thanks to heavy-duty metal casing

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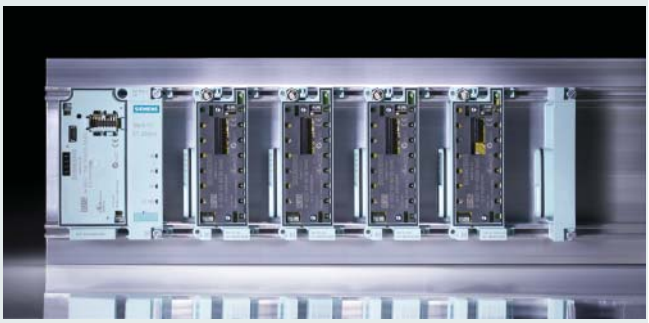
Simple installation and system-wide engineering

Simple configuration

Integral plug connections make installation quick and easy and therefore reduce the costs. In the case of modular systems, mounting is on a rail. The modules are snapped onto the rail and plugged into each other. The backplane bus is assembled automatically.

The sensors and actuators can be easily connected to a bus system without the need to use an array of single wires with cable distributors and cable racks. This makes the wiring simple and transparent, less error-prone and therefore low-cost.



Self-assembling backplane bus

Permanent wiring: Connections and electronics are separate from one another

Permanent wiring

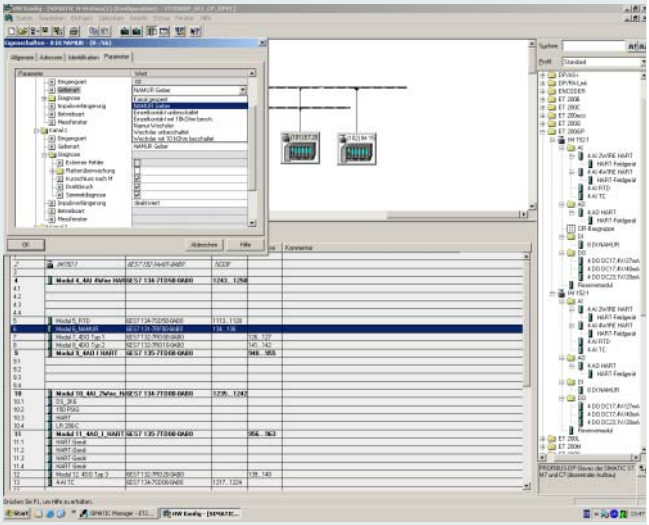
Due to the separation of mechanics and electronics, permanent wiring is possible, i.e. the station can be prewired before installation or start-up. Prewiring can therefore be inspected without the electronics modules which prevents damage to sensitive components. The start-up time is therefore reduced. The modules can also be replaced in the event of a fault without time-consuming rewiring.

Uniform engineering

The ET 200 systems can be integrated into the SIMATIC controller with minimal engineering outlay.

The widely implemented standard tool STEP 7 is used for engineering and diagnostics. The distributed I/O is configured in the same manner as the central I/O. Engineering can be performed from any point in the system – locally in the plant or centrally in the engineering station.

If the ET 200 is connected to a non-Siemens PLC over PROFIBUS or PROFINET, the supplied device master file is used. This file contains the configuration and parameterization data in standardized form and is used in the configuration tool of the non-Siemens master.



Configuration and parameterization with STEP 7

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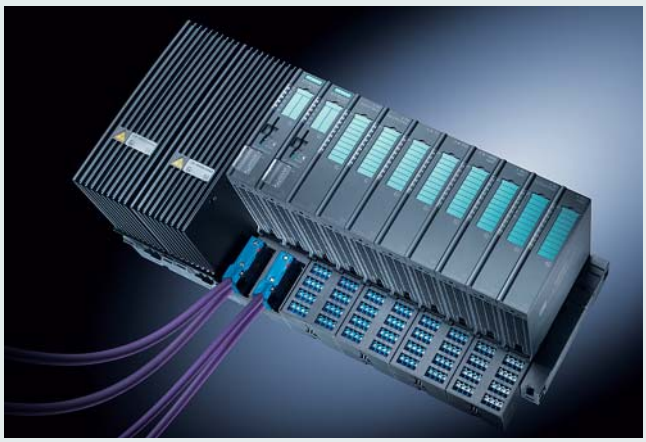
Increased plant availability

Hot swapping

In the event of a fault, electronic modules are easily replaced during operation with the equipment live (hot swapping).

The station remains functional, and the plant therefore remains available – there is no need for costly shutting down and starting up of the plant. While the components are being replaced, the wiring remains intact. Coding of the modules prevents mistakes when replacing them.

Hot swapping: Module replacement during operation



Redundant configuration with two power supplies and two interface modules

Redundancy

To increase plant availability, the SIMATIC system offers a system-wide redundancy concept.

ET 200 I/O devices are connected with two interface modules to the two PROFIBUS lines of a high-availability automation system. If the active system fails, the standby system takes over the functions immediately so that standstill can be avoided.

Configuration in Run (CiR)

Modifications or expansions are also required during operation of a plant (section), such as implementation of additional sensors or actuators, reparameterization of I/O modules (e.g. choosing of other interrupt limits). Possible applications are non-stop requirements, that is, in continuous processes that cannot be shut down or whose production cannot be interrupted: process plants or manufacturing plants with high restart costs.

Changes to the hardware configuration in RUN are possible when distributed I/O is connected to the S7-400:

- Stations can be added and removed, e.g. for configuring a new process line
- I/O modules can be added and removed, e.g. for implementing additional sensors
- I/O modules can be reparameterized, e.g. for replacement parts

Changes to the configuration are possible during normal operation

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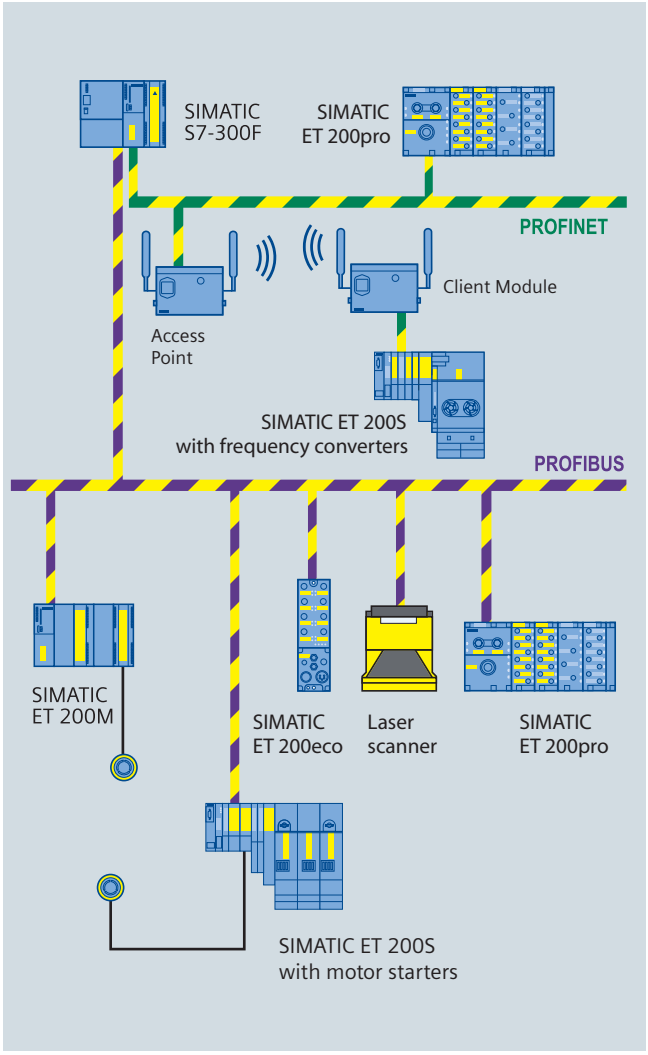
Integral safety engineering – SIMATIC Safety Integrated

Until recently it has been common to implement safety tasks and standard tasks using different systems. This led to discontinuous systems and additional outlay. With SIMATIC, however, the safety system is directly integrated into the standard automation.

This means that you have at your disposal a system-wide, safe and well-proven control system whose flexibility, easy expansion and comprehensive performance reserves further strengthen your powers of innovation. With SIMATIC Safety Integrated, you profit from an efficient and reliable system – in both the manufacturing and process industries.

Apart from the hardware, assembly and installation costs for separate safety wiring, Safety Integrated as a system-wide solution also saves engineering costs because standard and safety automation are configured in the same manner.



Versatility of ET 200 in safety-relevant area

SIMATIC Safety Integrated includes the failsafe programmable controllers SIMATIC S7-300F and S7-400F/FH as well as failsafe I/O and engineering products within the range of Safety Integrated. If a fault occurs, the complete programmable controller or a sub-process can be transferred to and retained in a safe state. Distributed I/O systems are used for distributed expansion of a failsafe programmable controller.

The failsafe SIMATIC ET 200 systems can be assembled as combinations including both failsafe and standard I/O modules. The I/O spectrum ranges from simple I/O channels through motor starters as far as frequency converters.

Safety-related communication can take place in the same manner as standard communication over the two PROFIBUS and PROFINET bus systems. These have been expanded for failsafe communication by means of the PROFIsafe profile. Safety-related communication and standard communication are now possible over the same cable – even "wireless".

Fail-safe SIMATIC I/O has been certified by the German Technical Inspectorate and satisfies even the most stringent safety requirements such as IEC 61508 (SIL 3) and IEC 62061, EN 954-1 (Category 4) and NFPA 79.

Advantages of SIMATIC Safety Integrated:

- Standardized, system-wide engineering.
- Use of the same hardware components for safety-relevant and standard automation.
- Space-saving, time-saving and cost-saving installation, e.g. mixed installation in a rack
- No additional safety bus – standard and safety-relevant communication are carried out in parallel on the same bus with the PROFIsafe profile for PROFIBUS and PROFINET (wireless too with PROFINET).
- Implementation of new fail-safe applications with Industrial Wireless LAN for connection of mobile, safety-related stations.
- Effective diagnostics functions reduce expensive down times.
- Maximum plant availability resulting from failsafe, fault-tolerant systems.

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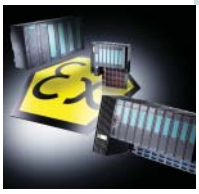
Use in hazardous areas



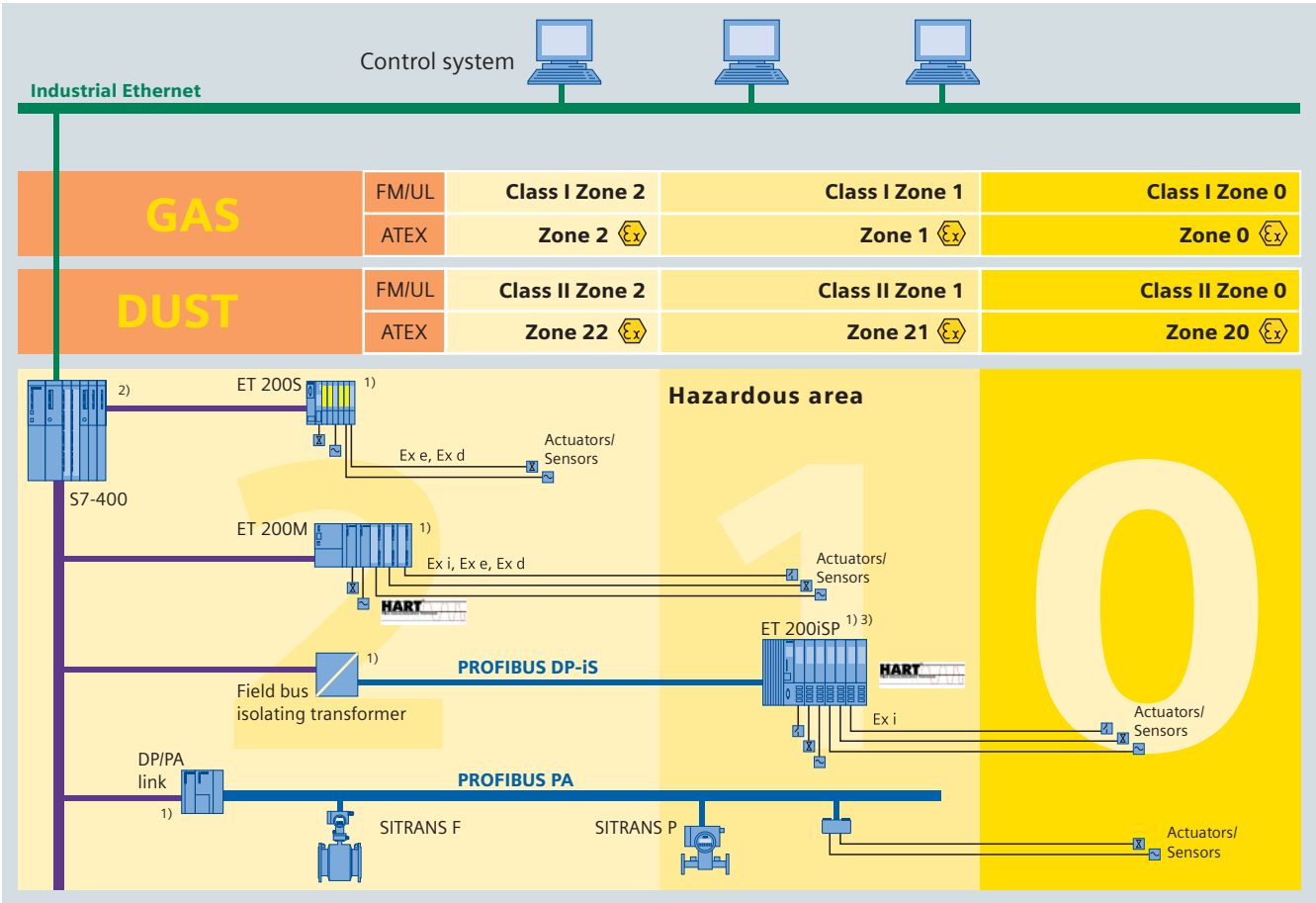
In many industries, the manufacture, processing, transport or storage of combustible materials results in the creation or release of gases, vapors or mist into the environment. Other processes create combustible dust. In combination with oxygen in the air, a potentially explosive atmosphere can occur that will result in an explosion if ignited. Special properties must be exhibited by the equipment used in these environments, and they must be certified. SIMATIC ET 200 is equipped for this, and includes a corresponding range of products.

ET 200 systems can be used in different zones – either in the zones 1 and 2 with gas atmospheres or in the zones 21 and 22 with dust atmospheres.

The sensors and actuators linked to the peripherals can even be used in zone 0 or zone 20.

A manufacturer's note is necessary for installation in Zone 2/22 (conformity of the control cabinet with the ATEX guideline). For installation in Zone 1/21, a certification of the control cabinet for gas/dust atmospheres must be available.

Data communication takes place as usual over PROFIBUS. If communication is implemented via PROFIBUS stations in zone 1 or, due to other reasons, via intrinsically safe PROFIBUS stations, the PROFIBUS is made intrinsically safe by means of an intermediate fieldbus isolating transformer. Thus the ignition power is limited to the permissible degree and the intrinsically safe PROFIBUS is routed into the explosive area.



ET 200 in hazardous gas and dust atmospheres

1) Dusty atmospheres: installation of components always in an enclosure with IP6x degree of protection.
2) With 10 A DC standard power supply
3) Installation of the station complies with FM/UL up to Class I, Division 2; connected sensors and actuators even up to Class I, Division 1 or installation of station and sensors/actuators according to FM/UL up to Class II/III, Division 1

Zone definition:
Zone 2 / 22 = Rarely or temporarily hazardous
Zone 1/21 = Occasionally hazardous
Zone 0/20 = Explosive area

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Mastering fast processes through isochronous mode

Distributed solutions applying isochronous mode guarantee extremely high accuracy as well as fast and reliable processing sequences. This is particularly important for controlling drives.

In order to control high-speed machines, production and machining processes, the processing cycles are synchronized. This means that the cycles of certain sequences are unified and embedded in a fixed time grid – the system clock. The processing sequences then exhibit continuity, and can therefore be handled faster and more reliably.

In order to implement this, short, repeatable and defined process response times are required. This means that I/O signals must be read in, output and synchronized with the user program at equidistant intervals.

For this reason, the time from acquisition of a signal by the distributed I/O through to the appropriate response of the actuator must be kept as short and as accurately reproducible as possible.

This requirement is solved in that a direct link is made between the equidistant DP cycle, the I/O modules and the user program.

Synchronism is decisive: Paper manufacture

Maximum demand for clock accuracy: Weaving machines

The synchronous linking of a SIMATIC automation solution to the equidistant PROFIBUS is referred to as *isochronous mode* and offers the following advantages:

- High-speed, time-based procedures in which reproducibility (deterministic features) plays a decisive role can also be automated with distributed I/O.
- Isochronous mode opens up a wide range of possible applications that are not simply restricted to drive applications. Isochronous mode is suitable for applications whose sensors and actuators are distributed throughout the machine.

The isochronous mode system function is supported by ET 200S and ET 200M.

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SIMATIC ET 200 Configurator

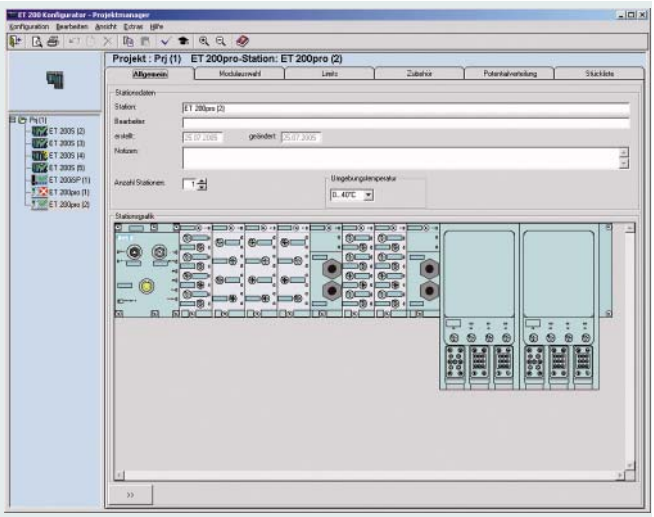
Just a mouse click away from a tailor-made I/O station: With the SIMATIC ET 200 Configurator

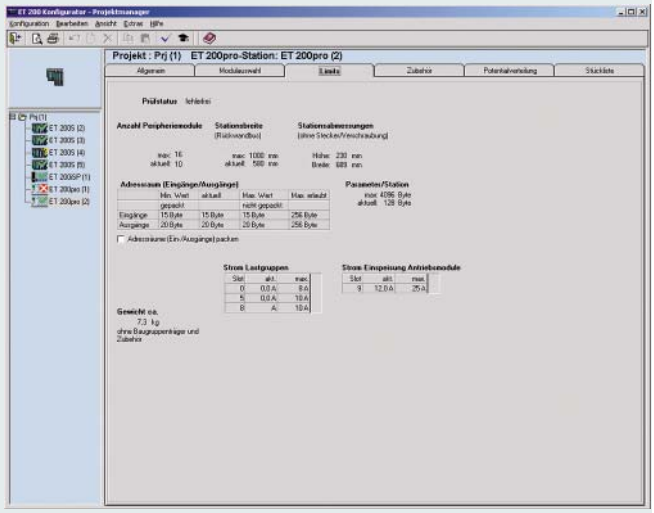
With the ET 200 Configurator, you get first class support with configuring your ET 200 station. The software tool guides you comfortably, easily and conveniently through the configuration and creates automatic ordering lists for you including accessories. It also supports you with compliance with limitations, for example, for load currents, slot rules or parameters.

The configuration generated in the ET 200 Configurator can be imported into STEP 7 without any difficulties. This reduces the engineering overhead and avoids double entries.

The software tool is structured clearly: Six configuration views make working easy and convenient.

- **General information**: General station data as well as a graphical presentation of the configured station
- **Module selection**: Guided selection of modules by means of module suggestions
- **Limits**: Display of station size, weight, number of modules, load voltage, parameters, etc.
- **Accessories**: Guided selection of the required accessories (module-specific or station-wide)
- **Distribution of potentials**: Graphical presentation of the potentials within a station
- **Parts list**: Automatic generation of a transparent parts list makes ordering easier





Configuration made easy with the ET 200 Configurator

The **ET 200 Configurator** can be found on the Internet
www.siemens.com/et200
and also in the Catalog *CA01* on DVD/CD-ROM

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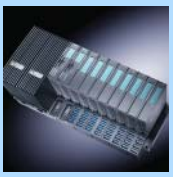
Product Overview
SIMATIC ET 200 for the control cabinet

IO system	ET 200S	ET 200M	ET 200L	ET 200iSP
				
Setup				
Degree of protection	IP20	IP20	IP20	IP30
Design	Bit modular, expandable block	Modular	Block	Modular
Assembly	Standard rail	Mounting rail	Standard rail	Mounting rail
Connection system for sensors/actuators	Multi-conductor connection, Spring-loaded/screw-type, Fast Connect	Single-conductor connection,Spring-loaded/screw-type, Top Connect	Multi-conductor connection, Spring-loaded/ screw-type terminals	Multi-conductor connection, Spring-loaded/ screw-type terminals
Special applications				
Safety engineering	■	■		
For use in hazardous areas	Zones 2, 22	Zones 2, 22		Zone 1, 21
Increased availability		Switched, redundant		Switched, redundant
Temperature range	0 ... +60°C [1]	0°C ... +60°C [1]	0°C ... +60°C [1]	-20°C ... +70°C
Vibration resistance (continuous)	2 *g*	1 *g*	1 *g*	1 *g*
Communication				
PROFINET (copper/fiber-optic)	■ / ■	■ / –	–	–
PROFIBUS (copper/fiber-optic)	12 MBit/s / 12 MBit/s	12 MBit/s / 12 MBit/s	1,5 MBit/s / –	1,5 MBit/s / –
System functions				
Permanent wiring	■	■	■	■
Hot swapping	■	■ (with active back-plane bus)		■
Isochronous mode, e.g. for high-speed control	■	■		
Expansion/configuration during operation	■ / –	■ / ■		■ / ■
Diagnostics (module-dependent)	Channel-discrete	Channel-discrete	Submodule-discrete	Channel-discrete
Functions				
Digital channels	■	■	■	■
Analog channels Incl. HART	■	■ ■		■ ■
Motor starters / frequency converters	■ /■			
Pneumatic interface	■ (from Bürkert)			■ (from Bürkert)
Technological functions	Counting/measuring, positioning, weighing	Count./measr., pos., cam ctrl., closed-loop ctrl., weighing		Counting, frequency measuring
Integrated CPU functionality	■ (via IM 151-7)	■ (via S7-300-CPUs)		
Sensors (IQ-Sense)	■	■		

[1] *As SIPLUS component also for extended temperature range -25 °C to +60 °C and corrosive atmosphere/condensation (www.siemens.com/siplus).*

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SIMATIC ET 200 without a control cabinet

IO system	ET 200pro	ET 200eco	ET 200R
Setup			
Degree of protection	IP65/66/67	IP65/67	IP65
Design	modular	Block	Block
Assembly	Mounting rail	Direct mounting	Direct mounting
Connection system for sensors/actuators	M12	M12	M12
Special applications			
Safety engineering	■	■	
For use in hazardous areas			
Increased availability			
Temperature range	-25...+55 °C (0...55 °C) [1]	0 ...+55 °C	0 ...+55 °C
Vibration resistance (continuous)	5 *g* (module-dependent)	5 *g*	5 *g*
Communication			
PROFINET (copper/fiber-optic)	■ / ■		
PROFIBUS (copper/fiber-optic)	12 MBit/s / ■	12 MBit/s / –	12 MBit/s / –
System functions			
Permanent wiring	■		
Hot swapping	■		
Isochronous mode			
Expansion/configuration during operation			
Diagnostics (module-dependent)	Channel-discrete	Submodule-discrete	Group-discrete
Functions			
Digital channels	■	■	■
Analog channels Incl. HART	■ –		
Motor starters / frequency converters	■ / ■		
Pneumatic interface	■ (from Festo)		
Technological functions			
Integrated CPU functionality	■		
Sensors (IQ-Sense)			

[1] *In parentheses: Temperature range of the frequency converter*

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SIMATIC ET 200S
The multi-talent with the comprehensive module spectrum

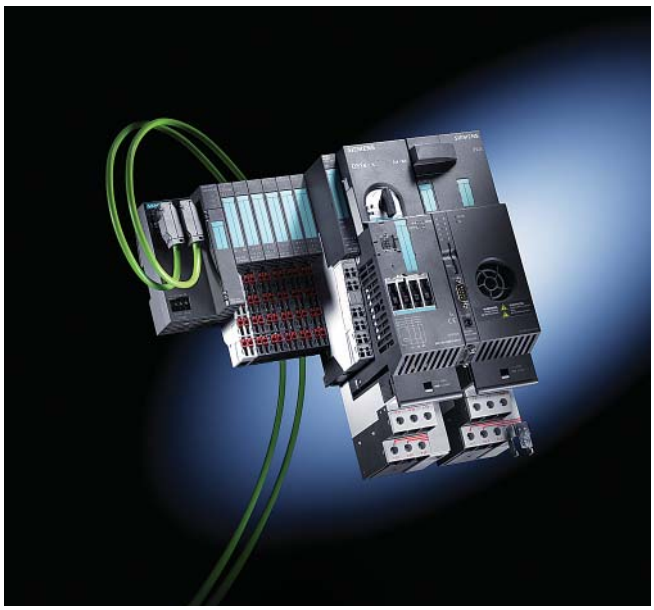
SIMATIC ET 200S is the multifunctional and bit-modular I/O system with IP20 degree of protection that can be exactly tailored to the automation task. Thanks to its rugged design, it can also be used under conditions of high mechanical stress.

Various interface modules are available for interfacing to the PROFIBUS and/or PROFINET bus systems. Interface modules with an integral CPU transfer the computing power of an S7-300 CPU directly into the I/O device. They therefore offload the central PLC, and permit rapid responses to time-critical signals. New high feature interface modules, fast I/O modules, isochronous mode and an extremely fast internal data transport increase the performance of the ET 200S and permits the use even with extremely fast closed-loop controls.

With the 8-channel digital input and output modules, the bit-modular ET 200S is even more compact. They are perfectly suited for configurations with many channels and a space-saving and cost-saving configuration is demanded. The 8-channel modules permit the connection of 2-wire sensors and they offer an simultaneity factor of 100% (i.e. 4 A summation current with 8 outputs with 0.5 A each).

Distributed automation solutions increasingly involve not just digital and analog signals, but also technological functions, motor starters, frequency converters or a pneumatic interface. The bit-modular ET 200S offers a comprehensive range of modules to implement the tasks:

- Technology modules are available e.g. for counting and positioning tasks, for cam control or for closed-loop control tasks.
- Using the motor starters, any three-phase loads up to 7.5 KW can be connected. Motor starters are available in several designs, including a fail-safe design.
- Frequency converters (also with integral safety technology) provide stepless speed control for asynchronous motors up to 4 kW.
- Pneumatic interfacing using modules from Bürkert.
- IQ-Sense sensor modules support the connection of intelligent sensors such as sonar BEROs.
- Failsafe I/O modules are used for inputs and outputs in safety-related plants with SIMATIC Safety Integrated.



ET 200S with PROFINET connection, I/O modules, motor starters and frequency converters

- SIPLUS components can be used even in an expanded temperature range of -25°C...+60°C and in a corrosive atmosphere or when there is condensation (www.siemens.com/siplus).

Diagnostics functions and hot swapping of modules increase plant availability:

- Comprehensive diagnostic interrupts indicate the module status on the one hand and channel-specific information on the other hand.
- Electronics modules, motor starters and frequency converters can be replaced during normal operation without the need for tools and with the equipment live (hot swapping). During replacement of a module, the SIMATIC ET 200S can continue to operate and the application will continue to function properly. If motor starters and frequency converters are used, even the otherwise obligatory isolation of the system can be avoided.

The **ET 200S Configurator** can be found on the Internet
www.siemens.com/et200s
and also in the Catalog CA01 on DVD/CD-ROM

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Low-cost, bit-modular design with multi-conductor connection

In addition to the extremely low space requirements, the ET 200S results in savings in wiring of up to 80% in comparison to conventional solutions.

The reasons for this are:

- The backplane bus is built up automatically.
- All supply terminals have the characteristics of terminal blocks, allowing signal leads and motor cables to be directly connected to the SIMATIC ET 200S without the need for intermediate terminals.
- The integral safety system is a system component – an additional safety bus can therefore be omitted.
- Reserve modules can be used to reserve module slots for future use.
- Independent wiring
- Considerably less cross-wiring thanks to the self-assembling voltage busses – this reduces the testing outlay and possible sources of error.
- The module labeling is not covered by the wiring when the module is installed.
- Easy configuration of an ET 200S station with the Configurator

Fast Connect

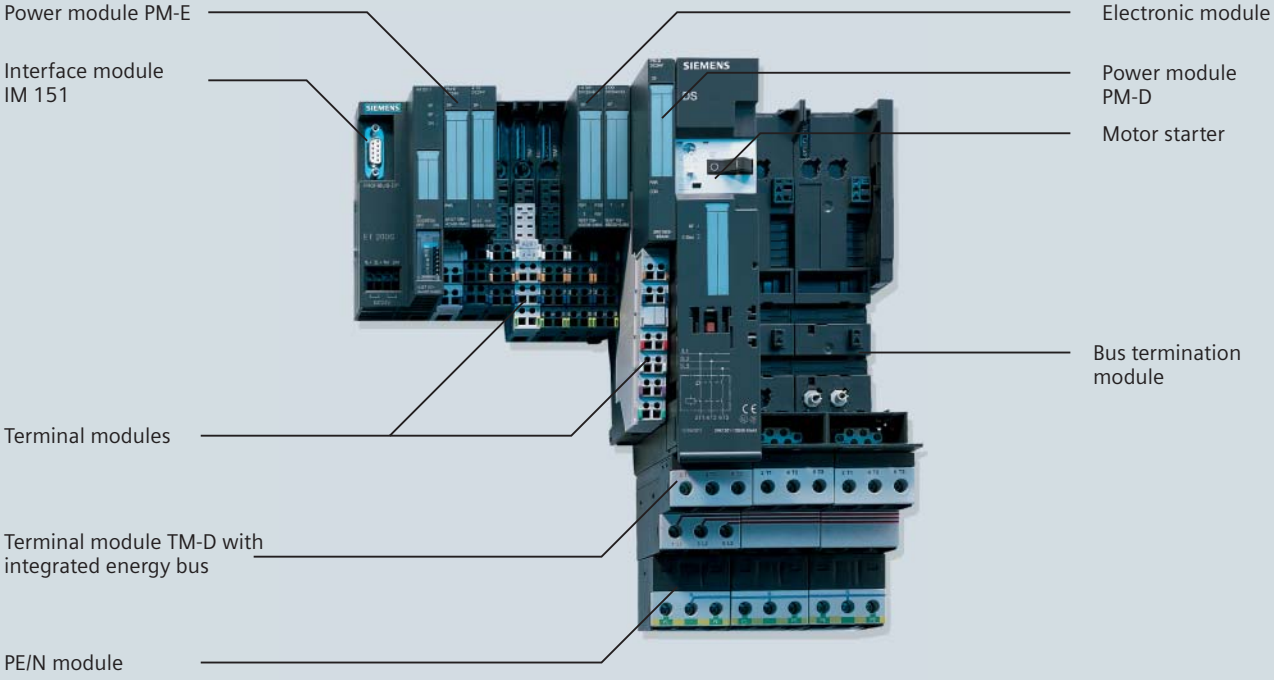
The insulation displacement method Fast Connect offers even more benefits for installation of the electronic and power modules.

With this new method, the standard conductor cross-sections from 0.34 to 1.5 mm² can be connected.

No preparation is required for installation:

FastConnect connection system

- Time savings of up to 60% for installation as compared to the conventional connection methods.
- No stripping or crimping necessary
- Easy, secure installation with a screwdriver
- Reduction in the number of installation errors
- The stripped length does not have to be determined



Bit-modular design of ET 200S

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Interface modules for bus connection

ET 200 S is connected to the bus system via the interface module – either to the well-proven PROFIBUS or to PROFINET, the open Industrial Ethernet standard. Different interface modules are available for selection:

	IM 151-1 BASIC IM 151-1 COMPACT	IM 151-1[5] Standard/ Standard FO	IM 151-1[5] High Feature (HF)	IM 151-3 PN	IM 151-3 PN HF PN FO	IM 151-3 PN HS	IM 151-7 CPU/CPU FO	IM 151-7[5] F-CPU
PROFIBUS	Copper	Copper/ FOC[1]	Copper				Copper/ FOC[1]	Copper
PROFINET				Copper	Copper/ FOC[1]	Copper[6]		
Master module							■	■
2-port switch [4]				■	■	■		
Number of modules	12	63	63	63	63	32	63	63
Station width	2m	1m/2m	2m	2m	2m	0.5m	1m	1m
Diagnostics [3]	Channel-specific	Channel-specific	Channel-specific	Channel-specific	Channel-specific	Channel-specific	Channel-specific	Channel-specific
CPU functionality							CPU 314	CPU 314
Fail-safety			■		■			■
Isochronous mode			■			■[6]		
Electronic rating plate [2]		■	■	■	■	■		
Firmware Update		Bus	■	Bus/Micro Memory-Card	Bus/Micro Memory-Card	Bus/Micro Memory Card	Micro Memory Card	Micro Memory Card
Order No. group 6ES7 151-	1CA.	1AA. / 1AB.	1BA.	3AA.	3BA.	3BA5-.	7AA. / 7AB.	7FA.

[1] *Plastic, polymer-cladded fiber (PCF)*

[2] *The electronic rating plate contains identification data saved in a module, e.g. Order No., release version, installation date, plant identification, which unequivocally identify the module and are available online, e.g. in order to simplify troubleshooting.*

[3] *Depending on module.*

[4] *The integral 2-port switch of the IM 151-3 now also easily permits a linear structure in addition to the star topology.*

[5] *As SIPLUS component also for extended temperature range -25 °C to +60 °C and corrosive atmosphere/condensation (www.siemens.com/siplus).*

[6] *Available with SIMOTION Controller from V4.1 SP1 and PROFINET with IRT.*

Interface module IM 151-3 PN for PROFINET with standard cable

Interface module IM 151-3 PN FO with fiber optic cable

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Distributed intelligence

The IM 151-7 CPU can be used in stand-alone mode as well as for distributed automation solutions with a medium-sized program. It corresponds to a CPU 314 and supports distributed preprocessing of the production data locally – it is also available in a failsafe version. It communicates with the higher-level programmable controller over the coexistent MPI/PROFIBUS DP slave interface. This results in the following benefits:

- Less load on the central controller
- Reduction in the response times to critical local signals
- More transparent and shorter programs
- Easier trouble-shooting
- Less load on the bus system
- Modularization of the system structure and precommissioning – also at different sites

Additional PROFIBUS line

Interface module IM 151-7: with integral CPU (also as F version) and master module

The DP master module (6ES7 138-4HA.) can be used with the IM 151-7 CPU to expand the ET 200S as master with an integrated DP master interface.

A lower-level PROFIBUS line can then be configured with further distributed I/O.

NEW Options handling

When options handling is used with SIMATIC ET 200S, the entire station incl. all options is configured. Modules for options that are not required are either replaced by reserve modules or can be omitted. The activation of optional functions is implemented without reconfiguration during operation. Options handling will be gradually integrated in the interface modules of ET 200S.

Two options handling versions are available:

With reserve modules

The station is configured with all options. I/O modules that are not required are replaced by low-cost reserve modules. They can be subsequently replaced by configured modules without reconfiguration and even during operation.

Without reserve modules

The station is configured with all options, but only the required modules (terminal and peripheral modules) are inserted. Modules that are not inserted can be inserted later as required and without reconfiguration.

Options handling is currently available in the interface modules IM 151-1 Standard (without reserve modules will be available soon) and IM 151-1 High Feature. Options handling for interface modules with PROFINET interface will be available soon.

SIMATIC ET 200S COMPACT – The block I/O featuring bit-modular expansion

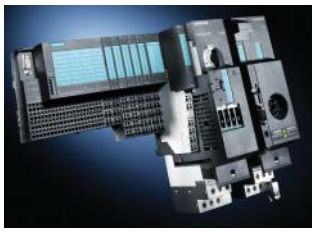
SIMATIC ET 200S COMPACT is the new interface for the bit-modular ET 200S I/O system.

ET 200S COMPACT expandable block

The new IM 151-1 COMPACT interface module expands the well-known range of proven ET 200S modules and permits use as a block I/O.

The functionality is based on the IM 151-1 BASIC and comprises an interface module and 32 channels in one block. Two different variants of the ET 200S COMPACT are offered – either a station with 32 digital inputs or mixed with 16 digital inputs and 16 digital outputs.

Altogether, up to 128 channels can be connected to SIMATIC ET 200S COMPACT by expanding the block with ET 200S modules (max. with 12 modules). Thus frequently required inputs/outputs in block form can be combined with bit-modular specialist modules such as motor starters, frequency converters, pneumatics etc.



ET 200S COMPACT with expansions

Expansions with the 8-channel modules support an extremely high packing density. As a result, one terminal box can accommodate more components or a smaller terminal box can be used.

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Motor starters for any application

The ET 200S motor starters can be used to protect and switch any three-phase load. The completely prewired devices are available in different performance classes as direct, reversing or soft-starters up to an output of 7.5 kW.

The terminal module contains the self-assembling energy bus and the terminals for direct connection of the motor cable. A motor starter can be removed and inserted without the need to isolate the system.

Standard motor starters

- Circuit-breaker and contactor combination up to 5.5 kW
- Direct-on-line or reversing starters
- Optional safety system

High Feature motor starters

- Combination of starter circuit-breaker, electronic overload relay and contactor or soft starter up to 7.5 kW
- Comprehensive diagnostics messages, e.g. actual current value
- Statistical data, e.g. current for the last overload trip, can be read out using the service and commissioning software Motorstarter ES.
- Parameterization over the bus
- Only two current setting ranges up to 7.5 kW
- Safety technology integrated

Failsafe motor starter

As soon as more complex or widely distributed safety applications are implemented, the Failsafe motor starter in combination with the PM-D F PROFIsafe power module is the optimized solution. Signals from safe sensors are read in through safe inputs at any required point in a plant and transferred to the failsafe programmable controller via PROFIBUS by means of the PROFIsafe message frame. In the application program they are linked to the Failsafe motor starters or the associated power module.

These motor starters based on the High Feature motor starter offer a completely new patented technique for safety shutdown: Whereas under normal operation the contactor is responsible for shutdown, in the event of a fault, e.g. welded contactor contacts, the integral dual processor monitoring also trips the circuit-breaker. This ensures that each individual motor starter achieves Category 4 or SIL 3 without additional redundant contactors.

The fail-safe motor starter monitors the function of the contactor regardless of whether the application is safety-related or not, so these devices are also suitable for use in high-availability processes.

Further characteristics that support high availability are:

- Type of coordination 2 over the complete power range up to 7.5 kW
- The emergency start function allows important processes to be continued to completion despite a reason for shutdown, e.g. overload.

Motor starter for failsafe ET 200S

Advantages of fail-safe motor starters over conventional safety systems

- Significantly fewer components, therefore less complex configurations and considerably less HW engineering and wiring overhead
- Rapid installation thanks to simple plug-in technology
- Motor starters are fault tolerant and failsafe
- High degree of flexibility thanks to assignment to shutdown groups in software
- When the safety application changes, there is less overhead because the wiring is retained

Two alternatives are available:
Local Solution

- Used for geographically limited safety applications
- Used for group deactivation of Standard, High-Feature or Failsafe motor starters without complex wiring for conventional safety systems
- For local evaluation of EMERGENCY-STOP circuits with automatic or monitored starting
- Cascading of the shutdown groups
- Can also be used in combination with external safety circuits

PROFIsafe Solution:

- Used for safety system applications that are complex and interconnected
- The logic of the safety functions (safe sensors can be freely assigned to Failsafe motor starters) is implemented with software and thanks to safety-related communication (PROFIsafe)
- Safety module PM-DF PROFIsafe forms 6 shutdown groups
- Selective and autonomous shutdown of the fail-safe motor starter for any safety function
- Also for controlling external safety systems through F-CM contact multiplier

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Frequency converter for stepless speed control

When stepless speed control of asynchronous motors up to 4 kW is required, the SIMATIC ET 200S FC frequency converter opens up new applications for the ET 200S I/O system in the field of drive technology.

The frequency converter is of a modular design: Apart from a closed-loop control module, one from three possible power sections is snapped onto purely mechanical components (terminal modules).

Advantages of the frequency converters

- No tools needed for installation
- Self-assembling communication and power busses
- Permanent wiring
- Removal of the closed-loop control module and power section under normal operation
- Complete parameter settings on optional Micro Memory Card for servicing requirements

Regenerative feedback function included

Line-commutated feedback of power into the supply system without he need for a chopper module or braking resistance is unique in this class.

The power loss of the overall system is reduced – which reduces the thermal load on the station and supports the use of smaller control cabinets. And what is more, the power fed back into the system when braking is available to other loads free-of-charge.

The new concept of the frequency converter also makes external line reactors superfluous. This saves additional installation space as well as procurement and installation costs.

For applications that are particularly sensitive to EMC, an external EMC filter is available that is connected in the infeed of the power bus.

Frequency converters in size A (0.75 kW)

Failsafe frequency converter in size B (2.2 to 4.0 kW)

Wide range of applications

- Simple drive tasks
- Conveyor system applications such as driving and lifting gear and winding and unwinding drives
- Closed-loop control with motor encoder for extremely precise speed and torque control
- Unwinding units, lowering of loads with hoisting gear, or electric braking of large centrifugal masses when making use of line-commutated energy recovery

Failsafe frequency converters

The integrated safety functions of the failsafe variants of the frequency converter support simple drive solutions in plant sections which pose a potential danger. In combination with the PM-D F PROFIsafe power module, the frequency converter in the failsafe version offers comprehensive integrated safety functions:

- Safe Torque Off (STO) –
  The drive is prevented electronically, and therefore without contact, from starting up.
- Safe Stop 1 (SS1) – Shutdown of the drive is monitored without a motor encoder or other encoder.
- Safely Limited Speed (SLS) – The violation of a reduced motor speed is monitored without a motor encoder or other encoder.

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I/O modules for simple applications

Module type	Information	Order No. group
Power modules for electronics modules and motor starters	For supplying and monitoring the load voltage and encoder voltage; voltage and/or fuse failures; additional LEDs indicate the status of the voltage and the fuse; different function AC, DC, PROFIsafe.	
	■ PM-E 24 V DC with diagnostics or PM-E 24 to 48 V DC, with diagnostics and status	6ES7 138-4CA.[1)]
	■ PM-E 24 V DC to 230 V AC with diagnostics and fuse	6ES7 138-4CB.[1)]
	■ PM-E F 24 V DC PROFIsafe for failsafe shutdown (max. Cat. 3) with digital output	6ES7 138-4CF.
	■ PM-D F 24 V DC PROFIsafe for fail-safe motor starter and frequency converter	3RK1 903-1.
Terminal modules	For the electrical and mechanical connection of I/O modules and process wiring. Available with screw-type and spring-loaded terminals as well as the FastConnect insulation-piercing technique.	
	■ TM-P for power; TM-E for electronics	6ES7193-4C.[1)]
	■ TM-D for motor starters	3RK1903-0A.
Electronics modules	For supplying the ET 200S with digital inputs and outputs; High Feature variants increase the plant availability and offer additional functions and diagnostics.	
Digital input modules	■ 2-, 4- and 8-channel	6ES7131-4.[1)]
	■ Available from 24 V DC to 230 V AC	
NEW	■ Different functionalities: Standard, High Feature M-switching Input module (Source-Input) 8 DI DC 24V SRC	
Digital output modules	■ 2-, 4- and 8-channel	6ES7132-4.[1)]
	■ Available from 24 V DC to 230 V AC; 0.5...5 A	
	■ Different functionalities: Standard, High Feature	
NEW	■ Electronics and relay M-switching output module (Sink-Output) 4 DO DC 24 V/0.5 A 8 DO DC 24 V/0.5 A	
Analog input modules	■ 2- and 4-channel	6ES7134-4.
	■ Current and voltage input, thermocouple and resistance measurement	
	■ Functionalities: Standard, High Feature, High Speed	
Analog output modules	■ 2-channel	6ES7135-4.
	■ Current and voltage output	
	■ Functionality: Standard, High Feature	
Relay module	■ 2-channel, 24 V DC or 24 to 230 V AC, 5A	6ES7132-4HB.
Fail-safe modules	■ Failsafe input module 4/8F-DI 24 V DC PROFIsafe	6ES7138-4FA.[1)]
	■ Failsafe output module 4F-DO 24 V DC/2 A PROFIsafe	6ES7138-4FB.[1)]
	■ Failsafe input/output module 4F-DI/3F-DO DC 24 V/2 A PROFIsafe	6ES7138-4FC.
	■ Fail-safe relay module 1F-RO 24 V DC or 24 - 230 V AC, 5 A	6ES7138-4FR.
Spare modules	Used as dummy modules for unused slots within an ET 200S station.	6ES7138-4AA.
IQ-Sense sensor module	The four-channel IQ-Sense sensor module offers, in conjunction with the new IQ-Sense sensors, a new concept for the intelligent integration of sensors in automation systems. ET 200 S makes all functions available to any PROFIBUS DP master modules. Standard function blocks are available for simplified handling on a SIMATIC S7. Up to four sensors are connected using just two cables and they are parameterized using IntelliTeach functions. Enhanced diagnostics.	
	■ 4-channel	6ES7138-4GA.

[1)] As SIPLUS component also for extended temperature range -25 °C to +60 °C and corrosive atmosphere/condensation (www.siemens.com/siplus).

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I/O modules for special applications, accessories

Module type	Information	Order No. group
Technological modules	For the solution of technological tasks, high-performance function modules are available that perform these tasks largely autonomously and relieve the CPU significantly. Used directly on site; parameterization using STEP 7 or GSD file; serial interface.	
	■ High-speed counting and measuring tasks with 5 V or 24 V encoders Counter module: 24 V DC / 100 kHz or 5 V DC / 500 kHz 1 COUNT	6ES7138-4DA.
	■ Simple positioning tasks through position sensing with SSI encoders SSI module 1 SSI	6ES7138-4DB.
	■ Controlled positioning of simple drives via digital outputs 1 POS U positioning module	6ES7138-4DL.
	■ Positioning with stepper motors over a pulse/direction interface 1 STEP stepper motor module	6ES7138-4DC.
	■ Proportioning, resetting and controlling of actuators and valves Pulse module (timer, pulse-width modulation, stepper motor) 2 PULSE	6ES7138-4DD.
	■ Serial data exchange via point-to-point connection 1 SI interface module	6ES7 138-4DF.
Measuring modules	SIWAREX CS is a compact electronic weighing system with calibration capability for the distributed I/O system SIMATIC ET 200S. The SIWAREX CS weighing module can be used for various different measuring tasks such as container weighing, fill-level measurement, platform weighing, crane weighing as well as the measuring of forces and torques. ■ Uniform design and communication through integration in SIMATIC S7 ■ Use in distributed plant concept through connection to PROFIBUS DP via ET 200S ■ Measuring of weight or force with a resolution of 65,000 increments ■ Calibration according to OIML R76 ■ A display with calibration capability can be connected ■ Extensive diagnostics possibilities ■ Easy to parameterize using the SIWATOOL CS program ■ Theoretical adjustment without adjustment weights ■ Replacement of module without renewed adjustment of scale ■ Use possible in Ex applications	7MH4910-.
	SIWAREX CF is a measuring module for connection of sensors operating according to the strain gauge principle. The module can be used for various tasks, e.g. for measuring forces and torques. ■ Uniform design technology and consistent communication thanks to integration into SIMATIC S7 ■ Use in distributed plant concept through connection to PROFIBUS DP via ET 200S ■ Measurement with a resolution of ± 16,000 units, accuracy 0.15% ■ Measurement rate 50 Hz ■ Ready-to-use, free application software "Getting started"	7MH4920-.
Motor starter (also with integrated safety system)	■ Direct, reversing and soft starters ■ Functionality: Standard, High Feature, Failsafe ■ Up to 7.5 kW	3RK1301-. 3RK1903-.
Frequency converter (also with integrated safety system)	■ Output up to 4.0 kW ■ Regenerative feedback in generating mode ■ Functionality: Standard and Failsafe ■ Fail-safe functions certified in accordance with Cat. 3 according to EN 954-1 and SIL2 according to IEC 61508	6SL3244-0S.
Accessories	■ Integrated shield connection system for low-impedance connections of individual lengths. Space-saving, low-cost standard components with a simple plug-in technique are used for this purpose. ■ Individual **color-coded labels** for terminals on the terminal modules; they are available in different colors. ■ **Labeling plates** for numbering the terminal modules: inscribed or blank. ■ DIN A4 **labeling sheets** in different colors, pre-perforated; suitable for printing using a laser printer Info: **www.s7-smartlabel.de**	6ES7193-4..[1)]

[1)] As SIPLUS component also for extended temperature range -25 °C to +60 °C and corrosive atmosphere/condensation (www.siemens.com/siplus).

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SIMATIC ET 200M
The multi-channel S7-300 I/O

The ET 200M distributed I/O station has a modular design with IP20 degree of protection. Up to 12 multi-channel signal modules (e.g. 64 digital inputs) and function modules as well as communication processors of the S7-300 can be used as I/O modules.

There are no slot rules. Hot swapping is permissible when using active bus modules.

Connection to PROFIBUS and PROFINET is achieved using interface modules – with PROFIBUS optionally also using fiber optic cables.

In addition to screw-type and spring-loaded terminals, connection of the signals can be made even simpler and faster using SIMATIC TOP connect. Preassembled front connectors with single conductors and a complete plug-in modular system are available. In the case of the FastConnect connectors, there is no need to remove any cable insulation. The cable is simply inserted and the contact is achieved through the IDC (Insulation displacement connection/contact) method.

When the ET 200M is operated with an S7-400H/FH, the availability of the plant can be increased:

- Switched connection:
  One ET 200M with two interface modules
- Redundant connection:
  Two ET 200M with one interface module each

When the ET 200M is connected to an S7-400 via PROFIBUS, the PLC can be configured during normal operation (configuration in RUN - CiR).

In this manner,

- complete ET 200M I/O stations can be added,
- individual modules can be added within a station, and
- individual digital and analog module parameters can be modified.

Hot swapping of signal modules is possible, thus reducing downtimes.

Failsafe I/O modules are used for inputs and outputs in safety-related plants with SIMATIC Safety Integrated.

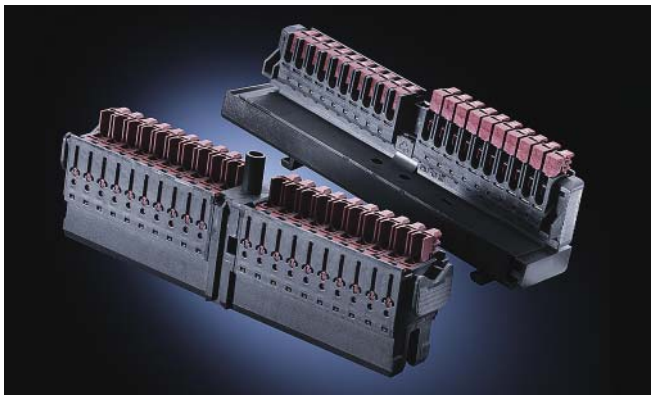
SIPLUS components can be used even in an expanded temperature range of -25°C...+60°C and in a corrosive atmosphere or when there is condensation (www.siemens.com/siplus).

ET 200M with PROFIBUS connection and S7-300 modules

FastConnect

The FastConnect system, in which wires no longer need to be stripped, offers even more advantages for assembling electronics and power modules:

- Obtainable as 20- and 40-pole versions
- Suitable for all S7-300 I/O modules
- Permissible conductor cross-section: 0.5...1.5mm²
- Suitable for rigid and flexible conductors
- Opening for test probes with a diameter of up to 1.5mm
- Time savings of up to 60% for installation compared with conventional connection methods
- No wire stripping and no crimping required
- Simple and safe assembly using a screwdriver
- Reduction of errors during installation
- No need to determine the stripped length of the wire



FastConnect connectors for ET 200M

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Interface modules for PROFIBUS and PROFINET

The various S7-300 modules in the ET 200M distributed I/O system are connected to the bus system via the interface module – either to the proven PROFIBUS fieldbus or to PROFINET, the open Industrial Ethernet standard.

PROFINET Interface module IM 153-4

The following interface modules are available:

	IM 153-1[5]	IM 153-2 HF[5]	IM 153-2 HF FO	IM 153-4 HF
PROFIBUS	Copper	Copper	Fiber-optic cable	
PROFINET				Copper
2-port switch [1]				
Number of modules	8	12	8	12
Station width	360 mm	520 mm	520 mm	520 mm
Diagnostics	Channel-specific	Channel-specific	Channel-specific	Channel-specific
Time-of-day synchronization on the PROFIBUS, time stamping of messages [2]		■	■	
Use of function modules (FM) and communications processors (CP)	Restricted	■	■	
Routing of parameterization data to intelligent field devices		■ (HART, IQ-Sense)	■ (HART, IQ-Sense)	
Connection to high-availability (redundant) systems (software redundancy, S7-400H)		■	■	
In the redundant system In the non-redundant system		■	■	
Fail-safety (PROFIsafe)		■	■	
Isochronous mode [3]		■		
Electronic rating plate [4]		■	■	
Firmware update		Bus	Bus	Bus/ Micro Memory Card
Order No. group	1AA.	2BA.	2BB.	4AA.

[1] *The integral 2-port switch of the IM 153-4 now also permits the problem-free setup of linear structures in addition to star topologies.*

[2] *Changes to digital inputs are tagged with a time stamp locally (in the IM 153 of the ET 200M) and transferred to the CPU by means of a process interrupt.*

[3] *Isochrone mode is the synchronized coupling of distributed I/O and the user program on PROFIBUS with a constant cycle time. In this manner, actual value sensing and setpoint output are performed synchronously and with a constant cycle time and with consistent data images.*

[4] *The "electronic rating plate" or identification data are the data stored in a module such as the Order No., release date, installation date or plant ID-code that uniquely identify this module and which are available online, for example, to simplify fault rectification.*

[5] *As SIPLUS component also for extended temperature range -25 °C to +60 °C and corrosive atmosphere/condensation (www.siemens.com/siplus).*

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S7-300 modules

The multi-faceted module range of S7-300 enables the ET 200M to be modularly adapted to a wide range of different tasks.

Standard modules (digital and analog modules) and modules for special application areas are available:

Digital modules	Function	Order No. group
SM 321	Digital input module SM 321, 8DI	6ES7 321-1FF. [1]
	Digital input module SM 321, 16DI	6ES7 321-1*H. [1]
	Digital input module SM 321, 32DI	6ES7 321-1*L. [1]
NEW	Digital input module SM 321, 64DI	6ES7 321-1BP.
SM 322	Digital output module SM 322, 8DO	6ES7 322-8*F. [1]
	Digital output module SM 322, 16DO	6ES7 322-1*H. [1]
	Digital output module SM 322, 32DO	6ES7 322-1*L. [1]
NEW	Digital output module SM 322, 64DO	6ES7 322-1BP.
SM 323	Digital input/output module SM 323, 8DI/8DO bzw. 16DI/16DO	6ES7 323-1B*. [1]
SM 327	Digital input/output module SM 327, 8DI/8DX	6ES7 327-1BH.

Analog modules	Function	Order No. group
SM 331	Analog input SM 331, 2AI	6ES7 331-7KB. [1]
	Analog input SM 331, 8AI	6ES7 331-7*F. [1]
SM 332	Analog output SM 332, 2AO	6ES7 332-5HB. [1]
	Analog output SM 332, 4AO	6ES7 332-**D. [2]
	Analog output SM 332, 8AO	6ES7 332-5HF. [1]

Modules for technological functions	Function	Order No. group
FM 350-1	Counting, measurement	6ES7 350-1AH. [1]
FM 350-2	Counting, measuring, proportioning	6ES7 350-2AH. [2]
FM 351	Open-loop positioning in rapid traverse/creep speed	6ES7 351-1AH.
FM 352	Electronic cam control	6ES7 352-1AH.
FM 352-5	High-speed Boolean operations	6ES7 352-5AH.
FM 353	Positioning with stepper motors	6ES7 353-1AH.
FM 354	Positioning with servo motors	6ES7 354-1AH.
FM 355C	Universal closed-loop control (continuous closed-loop control)	6ES7 355-0VH.
FM 355S	Universal closed-loop control (step controller)	6ES7 355-1VH.
FM 355-2	Temperature control with self-optimization	6ES7 355-2CH.
FM 357-2	Multi-axis interpolation, synchronism	6ES7 357-4AH.
SIWAREX U	Single-channel or dual-channel universal weighing module	7MH4601-1.
SIWAREX FTA	Fast weighing and dosing module with calibration capability	7MH4900-2.
SIWAREX FTC	Module for continuous weighing tasks	7MH4900-3.

[1] *As SIPLUS component also for extended temperature range -25 °C to +60 °C and corrosive atmosphere/condensation*

[2] *As SIPLUS component also for corrosive atmosphere/condensation (www.siemens.com/siplus)*

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Modules for failsafe systems	Function	Order No. group
SM 326F DI 24	Digital input (24 x 24 V single-channel or 12 x 24 V dual-channel)	6ES7 326-1BK. [1]
SM 326F DI 8 NAMUR	Digital input module (8 x NAMUR single-channel or 4 x NAMUR dual-channel)	6ES7 326-1RF.
SM 326F DO 10PP	Digital output (10 x 24V)	6ES7 326-2BF. [1]
SM 326F DO 8PM	Digital output (8 x current sourcing/sinking)	6ES7 326-. [1]
SM 336F AI 6 13Bit	Analog input module (6/4 inputs single-channel or 3/2 inputs dual-channel)	6ES7 336-1HE. [2]
Terminal module	Galvanic isolation between F module and standard module for SIL3/Cat.4	6ES7 195-7KF. [1]

Modules for areas subject to explosion hazard	Function	Order No. group
SM 321	Digital input module (4 x NAMUR)	6ES7 321-7RD0.
SM 322	Digital output module (4 x 15 or 24 V)	6ES7 322-5.D0.
SM 331	Analog input module (4 x 0...20 mA or 4...20 mA)	6ES7 331-7RD0.
SM 331	Analog input module (8 thermocouples or 4 thermoresistors)	6ES7 331-7SF0. [2]
SM 332	Analog output module (4 x 0...20 mA or 4...20 mA)	6ES7 332-5RD0.
SM 331	HART analog input module (2 x 0...20 mA or 4...20 mA)	6ES7 331-7TB0. [2]
SM 332	HART analog output module (2 x 0...20 mA or 4...20 mA)	6ES7 332-5TB0.

[1] As SIPLUS component also for extended temperature range -25 °C to +60 °C and corrosive atmosphere/condensation

[2] As SIPLUS component also for corrosive atmosphere/condensation (www.siemens.com/siplus)

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SIMATIC ET 200L

ET 200L block IO

The compact SIMATIC ET 200L I/O device to the IP20 degree of protection comprises one terminal block and one electronic block. Connection to PROFIBUS DP (with a transmission rate of 1.5 Mbit/s) is through the interface integrated in the electronic block.

Terminal block

The terminal block accommodates the electronic block. It carries the wiring, so that no cables need to be unplugged when the electronic block is replaced. The terminal blocks have a 2-wire connection system as standard. As an option, additional terminals can be clipped on to enable 3-wire or 4-wire connection to be used.

The terminal block can be mounted in any position on a standard rail. Terminal blocks are available for 16 and 32 channels with screw-type or spring-loaded terminals.

Terminal block	Order No. group
16 channels, screw-type terminals	6ES7 193-1CH0. [1)]
16 channels, spring-loaded terminals	6ES7 193-1CH1.
32 channels, screw-type terminals	6ES7 193-1CL0.
32 channels, spring-loaded terminals	6ES7 193-1CL1.

Electronic block

The electronic blocks contain the digital input and output channels for 24 V DC. The station address is set using rotary coding switches on the electronics block.

Electronic block	Order No. group
16 DI	6ES7 131-1BH. [1)]
32 DI	6ES7 131-1BL.
16 DO; 0.5 A	6ES7 132-1BH.
32 DO; 0.5 A	6ES7 132-1BL.
16 DI and 16 DO; 0.5 A	6ES7 133-1BL.

[1)] As SIPLUS component also for extended temperature range -25 °C to +60 °C and corrosive atmosphere/condensation (www.siemens.com/siplus)

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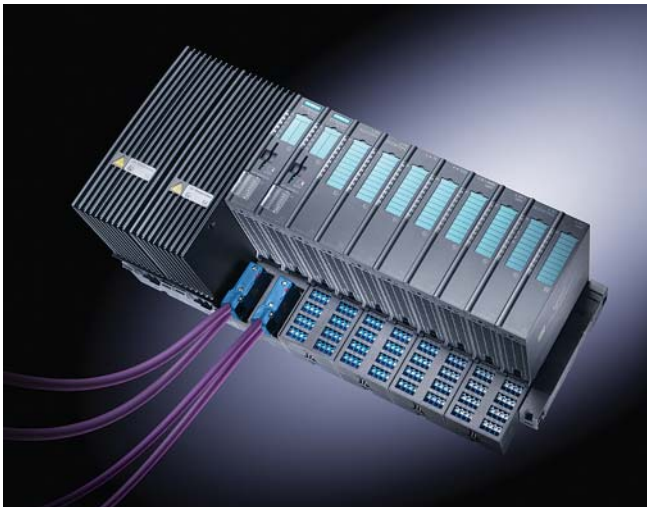
SIMATIC ET 200iSP
The intrinsically safe variant for hazardous areas



ET 200S with redundant PROFIBUS connection

ET 200iSP can be used in areas subject to explosion hazards with a gas or dust atmosphere:

- The ET 200iSP station can be installed in Zones 1, 21 and 2, 22.
- The connected sensors and actuators can also be located in Zones 0 and 20.

Communication between the field devices and the process control system or automation system is performed over PROFIBUS DP. This considerably reduces the wiring outlay. The terminal blocks commonly used today, as well as the necessary distribution boards and Ex isolating transformers for the signals, can be omitted.

PROFIBUS DP has established itself as the standard bus in the field level right up to hazardous areas. This open and system-wide communication keeps the solution flexible and also open to other manufacturers. International standardization of PROFIBUS DP also ensures future protection to the customer for investments that are often considerable and intended to last for many years.

ET 200iSP supports high availability of the system thanks to

- Configuration during normal operation
- Hot swapping
- Redundancy

During normal operation

- stations can be added,
- stations can be expanded with modules, and
- module parameters changed.

The independent wiring supports easy, reliable replacement of modules during normal operation. Hot swapping of the power supply is possible without arcing. PROFIBUS DP and/or the power supply can also be redundantly implemented.

HART support

ET 200iSP offers the HART protocol for connecting process devices with HART capability. These HART modules also support the transfer of auxiliary variables. Apart from the actual measured value, up to four IEEE variables can be transferred in the process image. By means of a routing function, a central station can access the HART process devices transparently over PROFIBUS DP. A higher-level control system can therefore perform central data administration.

The process devices are connected by means of a 4 to 20 mA analog signal. Further device information is transferred over a modulated signal:

- Parameters that are specified by a central engineering station (routing)
- Diagnostics data that are read by the engineering station

This principle is called HART (Highway Addressable Remote Transducer). The majority of process instruments, e.g. for temperature, level, pressure or flow measurements, have HART connections.

Powerful diagnostics with SIMATIC PCS 7

With SIMATIC ET 200iSP, numerous items of diagnostics information are generated when internal and external faults occur, e.g. on open-circuit or short-circuit.

The HART status of the connected HART field devices such as maintenance and additional information is mirrored in the diagnostics and signaled to the host control system. Standard diagnostics drivers are available for SIMATIC PCS 7 for the diagnostics messages. These drivers prepare all the relevant signals for the higher-level PCS 7 operator system.

The detected faults are transferred quickly to the higher-level systems and support online diagnostics from a central point at any time.

A watchdog module monitors the ET 200iSP by means of

- targeted reading or writing of I/O data
- Reading an input that switches (toggles) with a constant frequency
- Provision of an intrinsically safe power supply for the deactivation signal of the digital outputs

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Modular, intrinsically safe design

The ET 200iSP is installed in just a few steps:

- The terminal modules are snapped onto the rugged and well-proven S7-300 standard rail
- Prewiring without electronics modules with spring-loaded and screw-type terminals
- No need for tools, because the power supply, interface module and electronics modules are simply plugged in

The **ET 200iSP Configurator** can be found on the Internet
www.siemens.com/et200isp
and also in the Catalog *CA01* on DVD/CD-ROM

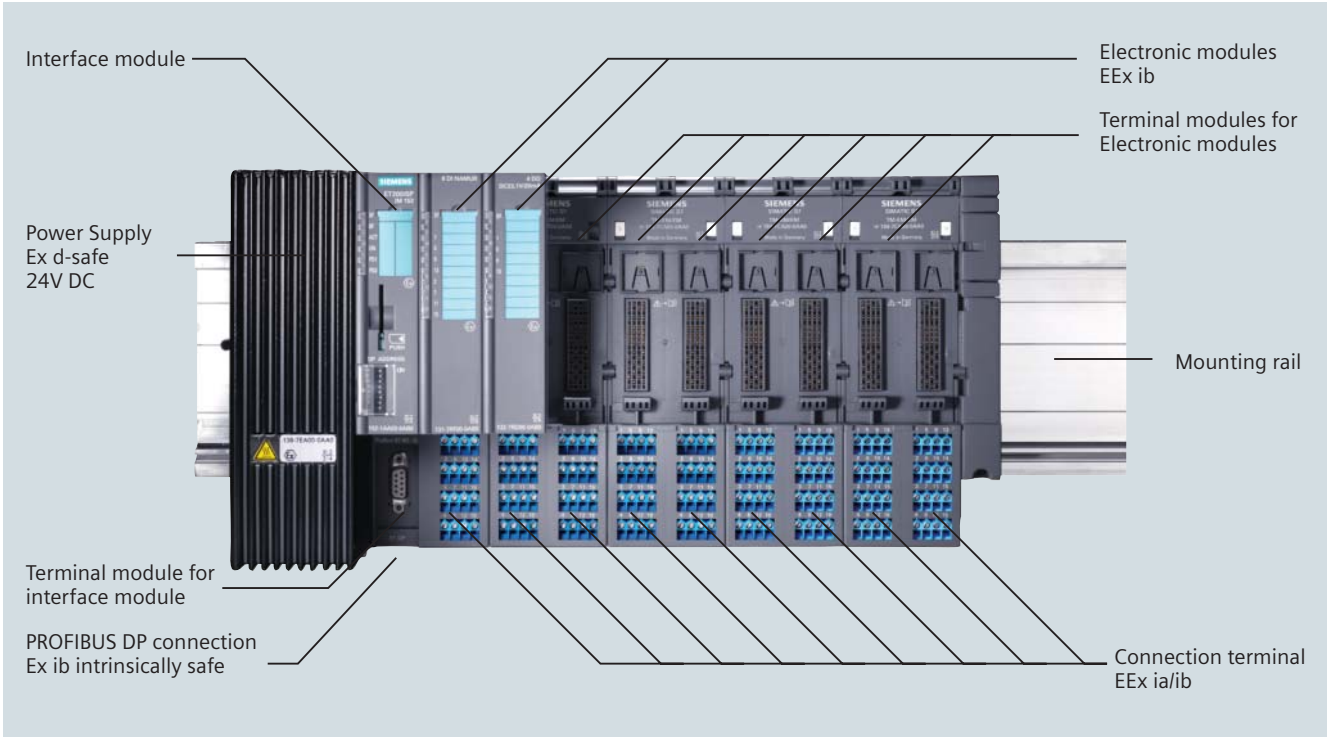
Safe in the field with the isolating transformer

Fieldbus isolating transformer

So that all the advantages of a failsafe bus installation are also available with PROFIBUS DP, an isolating transformer is used to make PROFIBUS DP intrinsically safe. This is implemented by separating the bus and limiting the power in the safe area. The fieldbus isolating transformer is used here as a barrier that converts PROFIBUS DP to an intrinsically safe PROFIBUS DP. It allows the PROFIBUS connector to be disconnected and connected even under Ex conditions. The fieldbus isolating transformer offers the following advantages:

- Plug and Play without the need for time-consuming circuit calculations and certifications (PROFIBUS International guidelines 2262)
- Simple modification/expansion
- Connection of numerous devices
- Implementation as a barrier or repeater

Modular design of the ET 200iSP



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Basic modules for the configuration

Powerful power supply

The power supply with the explosion-proof casing provides all the voltages and currents required for operation of the ET 200iSP and feeds them into the backplane bus of the terminal modules. The 24 V supply is connected to the power supply terminal through EEx e terminals.

Power Supply – can also be used redundantly

The power supply supplies the ET 200iSP with safe galvanically isolated operational voltage for:

- Up to 32 electronics modules
- PROFIBUS DP interface of IM 152
- Supply of sensors/actuators

It provides for the safety-related limitation of the output voltages. The PS has an explosion-proof metal casing (EEx d explosion protection) and is permitted to be removed and replaced in the working position (hot swapping) under hazardous conditions. It provides up to 5A for supplying the modules and the sensors and actuators. In fault-tolerant solutions, two power supplies can be configured redundantly.

Power Supply PS 138	
Voltage supply	24 V DC/5A
Dimensions	60 x 190 x 136.5mm
Order No. group	6ES7 138-7EA.

Redundant IM 152 interface module

Interface module IM 152

Interfacing to the intrinsically safe PROFIBUS DP with transmission rates up to 1.5 Mbit/s over the IM 152 interface module. The IM 152 communicates autonomously with the higher-level system (PLC or master system).

For I&M purposes (Identification & Maintenance), the IM 152 and the electronics modules have an electronic rating plate[1]. It is also possible for digital process signals to be tagged with a time stamp. The firmware of the IM 152 can also be upgraded with a plug-in SIMATIC Micro Memory Card (MMC) or via bus.

The IM 152 interface module and the PROFIBUS connector may be removed and replaced under hazardous conditions. In fault-tolerant solutions, up to two IM 152 modules can be configured redundantly.

Interface module IM 152	
Data transmission rate	9.6 kbit/s...1.5 Mbit/s
Protocol	PROFIBUS DP
Interface	RS 485 iS
Firmware Update	PROFIBUS, Micro Memory Card
Dimensions	30 x 125 x 136.5mm
Order No. group	6ES7 152-1AA.
Terminal modules	**Order No. group**
TM-PS-A for PS	6ES7 193-7DA.
TM-PS-B for PS redundant	6ES7 193-7DB.
TM-IM/IM for two IMs	6ES7 193-7AB.
TM-IM/EM for IM and one EM	6ES7 193-7AA.
TM-EM/EM for two EMs	6ES7 193-7CA.
Dimensions	60 x 190 x 52mm
Other components	
Reserve module	6ES7 138-7DA.
Watchdog module	6ES7 138-7BB.

[1] The "electronic rating plate" or identification data are the data stored in a module such as the Order No., release date, installation date or plant ID-code that uniquely identify this module and which are available online, for example, to simplify fault rectification.

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Digital and analog electronics modules

Input/output modules

4-channel and 8-channel digital and analog input/output modules (dimensions: 30 x 125 x 136.5mm) are available for the ET 200iSP.

Electronics module

The digital and analog process signals are matched to ET 200iSP via these electronics modules (EM).

The electronics modules support the connection of HART process devices and all generally available EEx i valves and therefore offer flexible application possibilities.

The process signals are connected via the terminals of the associated terminal modules with either screw-type or spring-loaded connection.

All EMs are designed as the EEx i "intrinsically safe" modules and can be easily replaced under Ex conditions (hot swapping).

The output modules have a special input for fail-safe deactivation:

- H deactivation (*active* high)
- L deactivation (*active* low)

External actuator deactivation is often required in plants in the event of evacuation or an emergency. L deactivation also provides wire-break monitoring.

The digital output modules permit load-free switching of the digital outputs.

Digital modules		
Application	**NAMUR encoder, etc.**	**Valves, indicator lights, DC relay, etc.**
Module	8 DI NAMUR	4 DO
Number of channels	8	4
Peculiarity	2 channels can be used as ■ Counter (max. 5 kHz) ■ Frequency meter (1 Hz to 5 kHz) ■ With gate function	■ 23.1 V DC, 20 mA ■ 17.4 V DC, 27 mA ■ 17.4 V DC, 40 mA
Order No. group	6ES7 131-7RF.	6ES7 132-7RD. [1] 6ES7 132-7GD. [2]

[1] *H deactivation*
[2] *L deactivation*

Analog modules		
Application	■ **Resistance thermometer (Pt100, Ni100)** ■ **Resistance test 600 ohms**	■ **Thermocouple types B, E, J, K, L, N, R, S, T, U** ■ **Thermal e.m.f. (± 80 mV)**
Module	4 AI RTD	4 AI TC
Number of channels	4	4
Resolution	15-bit + sign	15-bit + sign
Order No. group	6ES7 134-7SD5.	6ES7 134-7SD0.

Analog HART modules			
Use as HART module	**HART process devices**		
Use as analog module	**2-wire transducer 4 to 20 mA**	**4-wire transducer 0 - 20 mA, 4 - 20 mA**	**Current output 0 - 20 mA, 4 - 20 mA**
Module	4 AI I 2 WIRE HART	4 AI I 4 WIRE HART	4 AO I HART
Number of channels	4	4	4
Resolution	12-bit + sign	12-bit + sign	14 bits
Order No. group	6ES7 134-7TD0.	6ES7 134-7TD5.	6ES7 135-7TD0.

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Standards, approvals and accessories

Standards and approvals		
■ ATEX	II 2 G (1) GD I M2	Ex de [ia/ib] IIC T4 Ex de [ia/ib] I
■ IECEx	Zone 1	Ex de [ia/ib] IIC T4
■ cFMus	Class I, II, II	NI Division 2, Groups A,B,C,D,E,F,G T4 AIS Division 1, Groups A,B,C,D,E,F,G
	Class I	Zone 1, AEx de [ia/ib] IIC T4
■ cULus	Class I, II, II	Division 2, Groups A,B,C,D,E,F,G T4 providing int. safe circuits for Division 1, Groups A,B,C,D,E,F,G
	Class I	Zone 1, AEx de [ia/ib] IIC T4
■ CE	Acc. 94/9/EG (ATEX 100a), 89/336/EWG and 73/23/EWG	
■ Shipbuilding	Marine classification societies ■ ABS (American Bureau of Shipping) ■ BV (Bureau Veritas) ■ DNV (Det Norske Veritas) ■ GL (Germanischer Lloyd) ■ LRS (Lloyds Register of Shipping) ■ Class NK (Nippon Kaiji Kyokai)	

Accessories	Order No. group
Fieldbus isolating transformer	6ES7 972-0AC.
PROFIBUS DP connector	6ES7 972-0DA6.
Control cabinets	6DL2 804.

Ambient temperature	
Horizontal, for max. 5 A current output of the PS	-20...+70 °C
Horizontal, for max. 3.5 A current output of the PS	-20...+70 °C
Other mounting positions	-20...+50 °C

Control cabinets available as accessories

The housings (control cabinets) are suitable for hazardous areas of Zones 1 and 2 as well as 21 and 22. They either have surface treatment or are made of non-corrosive material.

The permissible operating temperature lies between -20° and +75°C. The main components in the scope of supply of the housing are:

- Housing with wall bracket
- Mounting rail
- Equipotential bonding strip
- Cable and wire grommets

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SIMATIC ET 200pro
Compact and multi-functional

SIMATIC ET 200pro is an extremely small, rugged and high-performance I/O system with IP65/66/67 degree of protection. It does not require a control cabinet and can be directly mounted on the machine. Its modular and time-saving structure allows flexible, customized, distributed automation solutions to be implemented.

ET 200pro can be connected to well-proven fieldbuses such as PROFIBUS or to PROFINET, the open Industrial Ethernet standard for company-wide automation.

ET 200pro offers comprehensive diagnostics to reduce the downtimes of your plant:

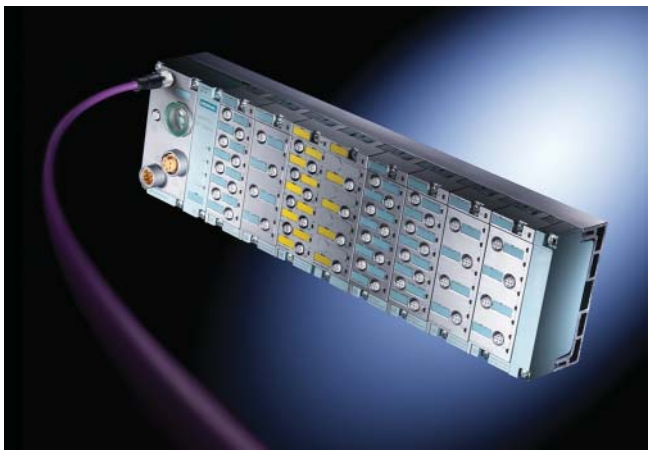
- The standard modules also offer module diagnostics for short-circuiting of the encoder supply or the outputs.
- The High Feature modules offer more precise diagnostic functions through channel diagnostics for short-circuit and wire-break. Additional process interrupts can be used for digital inputs for six channels.
- Diagnostic alarms are reported to the higher-level PLC over PROFIBUS or PROFINET in the form of plain text.

Fail-safe electronics modules and high-feature interface modules are available for automation tasks with maximum safety demands. The electronics modules can be used on their own in a station, or in mixed configurations with standard modules.

Together with the failsafe SIMATIC S7-300F and S7-400F controllers, automation tasks can be solved with safety requirements up to SIL 3 (EN 61508) or up to Category 4 (EN 954-1) – efficiently and without cabinets.

Failsafe communication between the ET 200pro and the associated failsafe higher-level CPU is therefore using the PROFIsafe profile – via PROFIBUS or PROFINET.

The **ET 200pro Configurator** can be found on the Internet
www.siemens.com/et200pro
and also in the Catalog *CA01* on DVD/CD-ROM



ET 200pro with PROFIBUS connection

ET 200pro with PROFINET connection,CPU and RFID module

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Modular, space-saving design

The ET 200pro is compact and up to 16 modules can be combined as required over a length of up to one meter. An ET 200pro station can be preassembled on the work bench with narrow module carriers and then fitted to the machine as a complete unit. Alternatively, the compact module carrier can also be fixed in place first and the station can be assembled later. The modules are simply latched into the module carrier and pushed onto each other. Module carriers are available with 0.5 m, 1 m and 2 m.

The expansion modules are divided in three sections, a bus module, an electronics module and a connection module:

- The **bus module** contains the backplane bus for signals and supply voltage in build-as-you-go design.
- The **electronics module** determines the function and is easily replaced during normal operation with the equipment live (hot swapping). The station therefore remains functional in the event of a fault. Coding prevents the wrong module from being plugged in inadvertently.
- The **connection module** complete with independent wiring is plugged on and screwed down with 2 screws. Preassembled connecting cables can be attached quickly and easily.

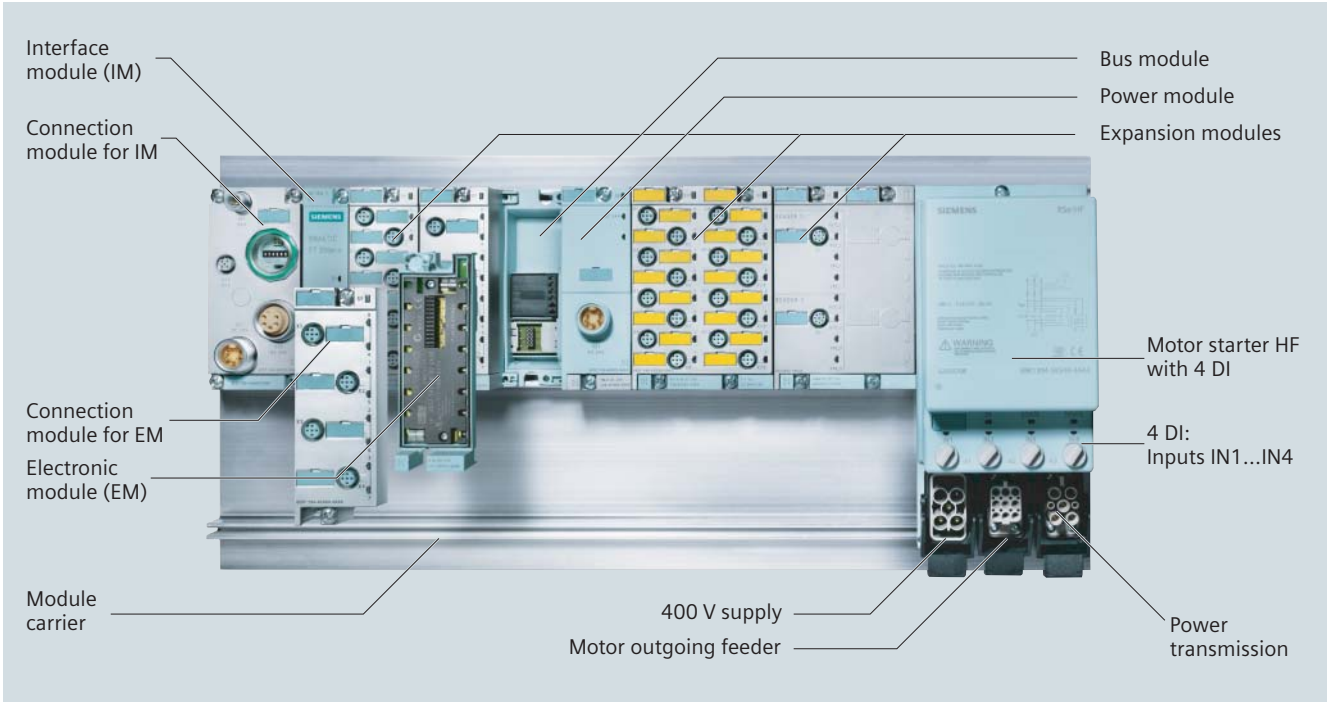
8-channel electronics modules can be combined with the 8 x M12 or 4 x M12 connection modules. This gives you the choice of single or dual assignment of the M12 sockets. A wide variety of different sensors and actuators can therefore be connected to the electronics module without the need for additional accessories such as Y connectors or Y leads. This not only reduces the wiring but also the costs for accessories and parts inventories.

Failsafe I/O modules are used for inputs and outputs in safety-related plants with SIMATIC Safety Integrated.

Selective formation of load groups

Power modules allow load groups to be built up as required by supplementary supply from the load power supply. In this case, the same connection techniques (direct connection; M12, 7/8"; ECOFAST) are available as for the power supply of the complete station. More than one load segment can be integrated into a single station.

In the interface and in each power module, built-in fuses ensure that nether total failure of all load groups nor damage outside the station can occur.



Modular design of the ET 200pro

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Interface modules for PROFIBUS

The **interface modules (IMs) for PROFIBUS** can be combined with three different modules for connecting the bus and power supply.

All **connection modules** for PROFIBUS have visible address setters that allow the addresses to be easily read as well as a selectable terminating resistor. The integrated T functionality supports the start-up of partial segments and uninterrupted bus communication in the event of a servicing requirement.

- **Direct connection** with cable gland: For up to 16 A electronic load and a conductor cross-section of up to 2.5 mm².
- **ECOFAST** (Energy and Communication Field Installation System) – The standardized Siemens connection technique for cabinet-free distribution is based on hybrid cables for bus signals and power supply.
- **M12, 7/8"**: The familiar connection method with widely implemented connector standard.

Interface modules	IM 154-1 DP IM 154-2 DP HF
Protocol	PROFIBUS DP
Transmission rate, max.	12 MBit/s
Firmware Update	via PROFIBUS
Dimensions (with connection module)	90 x 130 x 173 mm with CM IP DP M12, 7/8" 90 x 130 x 120 mm with CM IP DP directly 90 x 130 x 80 mm with CM IP DP ECOFAST
Order No. group	6ES7 154-1. 6ES7 154-2.

PROFIBUS interface module, M12, 7/8" connection

PROFIBUS interface module, with direct connection

PROFIBUS interface module, ECOFAST connection

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Interface module for PROFINET

The **interface module** (IM) **for PROFINET** contains a 2-port switch for easy configuration of a line structure. There is an M12 connection for PROFINET and a 7/8" connection for the power supply. More parameters are possible per station using PROFINET, and therefore more high-function modules can be used. When servicing, the IM can be replaced without using a programming device – the device name and parameters are saved on the the module.

With the **interface module IM 154-4 PN HF**, the interface module and terminal module are separated as with the PROFIBUS variant so that different connection methods are available.

The interface module offers both the tried and tested M12 7/8" terminal and the possibility of a push-pull connection. The integrated switch permits the easy setup of line structures.

Interface module IM 154-4 PN HF	
Function	PROFINET Interface module HF for ET 200pro with integrated switch and data transfer rates up to 100 MBit/s
Mounting dimensions WxHxD (mm)	135 x 130 x 50,8
Order No. group	6ES7 154-4AB10-0AB.

The following connection modules are available:

Connection modules CM IM PN		
	M12, 7/8"	2xRJ45 2xSCRJ FO
Function	■ Connection module for PROFINET interface module ET 200pro	
Connection	■ 2x M12 and 2x 7/8"	■ 2x RJ45 / 2x SCRJ FO ■ 2x power connector (push-pull)
Mounting dimensions WxHxD	90 x 130 x 50.8 mm	90 x 130 x 50.8
Order No. group 6ES7...	194-4AJ00-0AA.	194-4AF00-0AA. 194-4AG00-0AA.

CPU module

CPU module

CPU module for ET 200pro

The interface module IM154-8 CPU with CPU functionality is based on the CPU 315-2 PN/DP and offers the same quantitative framework and functions. The IM154-8 CPU has two communication interfaces,

- a combined MPI/PROFIBUS DP interface and
- a PROFINET interface with three ports.

The IM 154-8 CPU supports both PROFINET IO (up to 128 IO devices can be connected) and PROFINET CBA, as well as PROFIBUS DP (as a master for up to 124 slaves).

The IM 154-8 CPU is not only compatible with the S7-300 CPUs with regard to programming, but it also features a high degree of data retentivity (protection against voltage failure). A separate LED indicates maintenance alarms. Thanks to the Micro Memory Card, modules can be replaced without any problems. A firmware update can be installed over the network.

Web-server functionality is also available for information, status, diagnostics and time-synchronization over Ethernet (NTP). The open Ethernet communication (TCP/IP, UDP, ISO-on-TCP) offers fast and reliable exchange of data. Isochronous mode is possible on PROFIBUS.

There is less loading on the central controller because individual plant sections can be configured, started up, diagnosed and operated individually.

CPU module	IM154-8 CPU
PN/DP connection block	CM IM PN DP M12 7/8"
Degree of protection	IP65/67
Memory	256 kB / 85 k instructions
Interfaces	X1: MPI/DP interface (2x M12) X2: PN interface (2x M12, 1x RJ45)
CPU mounting dim. WxHxD	135 x 130 x 59.3
Connection block mounting dimensions W x H x D (mm)	90 x 130 x 50.8
CPU Order No. group	6ES7154-8AB.
Connection block Order No. group	6ES7194-4AN.

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Electronic modules

Electronics modules

Digital electronics modules with 4 and 8 channels for 24 V and analog electronics modules with 4 channels are available for voltage, current and resistance thermometers.

Digital electronic modules	Order No. group
EM 8 DI DC 24V	6ES7 141-4BF.
EM 8 DI DC 24V HF	6ES7 141-4BF.
EM 4 DO DC 24V, 2A	6ES7 142-4BD.
EM 4 DO DC 24V, 2A HF	6ES7 142-4BD.
EM 8 DO DC 24V, 0.5A	6ES7 142-4BF.

Analog electronics modules	Order No. group
EM 4AI U HF	6ES7 144-4FF.
EM 4AI I HF	6ES7 144-4GF.
EM 4AI RTD HF	6ES7 144-4JF.
EM 4AO U HF	6ES7 145-4FF.
EM 4AO I HF	6ES7 145-4GF.

Different connection modules are available for screwing onto the I/O:

- CM IO 8xM8
- CM IO 2xM12, 4xM12, 8xM12
- CM IO 1xM23

Fail-safe modules

Fail-safe electronic modules	Order No. group
EM 8/16 F- DI DC 24V	6ES7 148-4FA.
EM 4/8 F-DI/F-DO DC 24V	6ES7 148-4FC.

The following connection modules are available:

- CM IO F 12xM12
- CM IO F 16xM12

RFID communication

RFID communications module RF 170C	Order No. Group
Electronic module	6GT2002-0HD.
Terminal block	6GT2002-1HD.

Pneumatic components

Pneumatic components

The PM 148-P pneumatic module supports the use of ET 200pro for standard pneumatic applications. Up to 7 pneumatic modules can be used per ET 200pro station.

Pneumatic module PM 148-P with Festo valve terminal

- Two single-action or dual-action cylinders can be controlled through the pneumatic module. Integration of electronics and pneumatics on the same module reduces the implementation outlay.
- The pneumatic module is designed for a CPV 10 or CPV 14 valve terminal from FESTO. The ET 200pro can then also be used for applications requiring flexible pneumatics. A wide variety of valve functions from the standard FESTO spectrum and a choice of flow rates facilitate an extensive range of applications.

PM 148-P pneumatic module	
Digital outputs	16, For controlling the valves
FESTO valve terminals	CPV 10, CPV 14 (can be ordered from Festo)
Order No. group	6ES7 148-4E.

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Compact, intelligent motor starters

The intelligent ET 200pro motor starters are used for starting and protecting motors and loads up to 5.5 kW. They are available in the versions electromechanical Standard and High Feature motor starters, and electronic High Feature motor starter.

SIMATIC ET 200pro with electromechanical/electronic motor starter

The electromechanical motor starter switches with conventional contactors and is available as direct or reversing starter with optional 400 V brake control.

The electronic motor starter is equipped with semiconductor switching elements and therefore it is especially suitable for applications with high switching frequencies. This High-Feature device not only switches motors with a switching frequency on and off directly, it also implements the function of a full-fledged soft starter for soft starting and stopping. Conversion from motor starter to soft starter is implemented by simple reparameterization in the SIMATIC Manager.

The High Feature motor starter differs from the Standard motor starter in that it has more parameters and four parameterizable digital inputs. Parameterization is easy and convenient to carry out using the SIMATIC Manager.

The motor starters ET 200pro feature high functionality with a small footprint, as well as simple and fast configuration and installation – and they increase the availability of production plants.

Easy installation

The compact ET 200pro motor starters can be installed in the ET 200pro station with just a few actions. The integral connector technology results in significant reduction of the wiring overhead. The motor cables can be plugged directly onto the motor starter module. The compact design enables up to eight motor starters to be integrated in a one meter wide station in the field.

Electronic current measurement

The actual current flow with the ET 200pro motor starter is measured electronically. The evaluation of defined current limits for the parameterizable electronic overload protection increases the availability of the drive system. An upward or downward violation is signaled by the ET 200pro to the host controller, resulting in high plant availability. The motor starter recognizes unbalanced load currents, and switches these off directly. All motor protection functions can be defined by simple parameterization. The local control station which is sometimes required for a drive is provided via the integral digital inputs (High Feature motor starter) and can therefore be easily incorporated into the control system.

Special modules for further functions

If required, an optional repair switch module can be used. For example, it isolates series-connected starters from the supply voltage or serves as short-circuit protection for series-connected loads with 25 A circuit-breakers (group fusing).

Repair switch module

Safety modules

The Safety Motorstarter Solution local or Solution PROFIsafe is used for safety-oriented applications.

For local safety applications, the safety local repair switch module with safe input and the 400 V disconnecting module are used. These two components permit a safe shutdown of the 400 V supply of the series-connected motor starters.

PROFIsafe solutions are implemented quickly and easily by using an F switch module in combination with a 400 V disconnecting module.

Type selection	Order No. group
Motor starter Standard	3RK1 304-.
Direct starters, mechanical	5.S40-4AA.
Reversing starters, mech.	5.S40-5AA.
Motor starter High Feature	3RK1 304-.
Direct starters, mechanical	5.S40-2AA.
Reversing starters, mech.	5.S40-3AA.
Direct / Soft starter, electron.	5.S70-2AA.
Reversing / Soft starter, elec.	5.S70-3AA.
Special modules	3RK1 304.-
Repair switch	0HS00-6AA.
Safety Local repair switch	0HS00-7AA.
400V switch-off module	0HS00-8AA.
F-Switch	6ES7 194-4DA.

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NEW Frequency converters in two variants

SIMATIC ET200pro FC frequency converters designed as a SIMATIC module can be seamlessly integrated in the ET 200pro system. Two device variants (with and without safety functions) with a capacity of up to 1.1 kW (1.5 kW with reduced ambient temperature) are available.

Flexible and quick

The integration of the frequency converter in the distributed I/O system SIMATIC ET 200pro offers the following advantages:

- Flexibility due to open combination of ET 200pro modules with the frequency converter
- 400 V power transmission to downstream converters via jumper plugs up to 25 A

Furthermore, the ET 200pro FC adopts numerous highlights of the SINAMICS drives family:

- V/f control and frequency control without sensors
- Regenerative feedback of braking energy into the supply system (same technology as of the SINAMICS G120 power unit PM250). Thus braking resistors and choppers can be omitted
- Integrated safety functions: functional safety without complex external protective circuits
- Optional Micro Memory Card for the automatic download of parameters
- Configuration of the motor-frequency converter system by means of the SIZER (as of Version 2.8)
- Parameterization through STARTER (as of V4.1, SP1)

Integrated safety functions

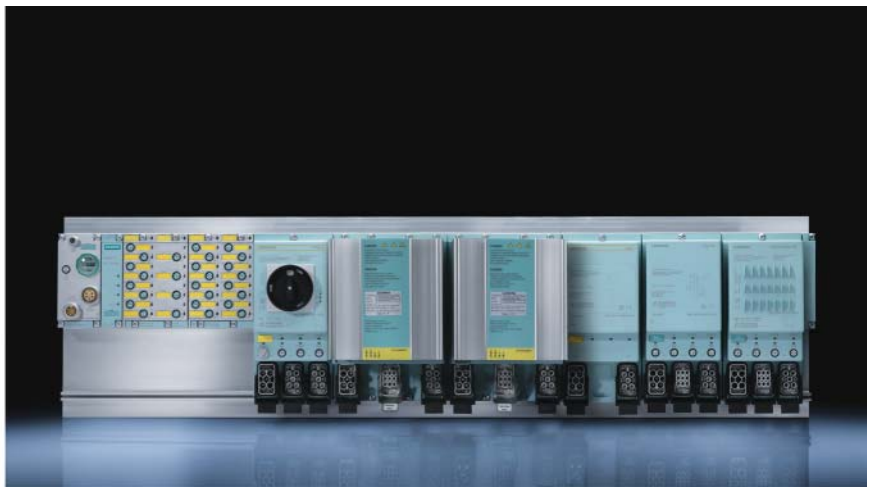
The failsafe version of SIMATIC ET 200pro FC offers numerous safety functions certified according to Category 3 of EN954-1 or SIL 2 of IEC61508:

- Safe Torque Off (STO, safe standstill) – safely disabled torque to protect against an active movement of the drive.
- Safe Stop 1 (SS1, safe braking ramp) – safe stop 1 for the continuous monitoring of a safe braking ramp.
- Safely Limited Speed (SLS, safely reduced speed) – safely limited speed to protect against dangerous movements due to exceeded limit speeds.

The functions "Safe Stop 1" and "Safely Limited Speed" can both be implemented without motor sensors or encoders. The safety functions can be controlled via Safety Local Repair Module (F-RSM) inputs or via F-Switch PROFIsafe module.

Frequency converter	Order No. group
ET 200pro FC frequency converter with integral safety functions	6SL3235-0TE21-1SB.
ET 200pro FC Standard frequency converter	6SL3235-0TE21-1RB.

Frequency converter ET 200pro FC



ET 200pro station with frequency converters and motor starters

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SIMATIC ET 200eco
Digital block I/O in IP65/67

ET 200eco has a compact, rugged casing and is very easy to use. It can be connected to PROFIBUS DP at up to 12 Mbit/s.

The plant availability is increased by the integrated T functionality in the connection block. The electronic block can be replaced with the equipment live without the need to interrupt the supply voltage or the bus train.

The following diagnostic functions are available for checking the mode of operation of the ET 200eco:

- BF (Bus Fault)
- SF (system fault)
- Encoder and load power supply

The diagnostic data are indicated by LEDs on the module and can be evaluated by software on the PG/PC or by user program of the PLC.

Setup

ET 200eco comprises basic modules and two different connection blocks. Selection is possible between M12, 7/8" and ECOFAST:

- Bus connection via 2 x M12 and power supply via 2 x 7/8" with 2 rotary coding switches for PROFIBUS address assignment
- ECOFAST: 2 x RS 485 hybrid fieldbus connection with identification plug for setting the PROFIBUS address

In the 16 DI version, antivalent sensors can also be connected.

Module range

For the application and integration of PROFIBUS applications, a compact, perfectly interacting module spectrum of digital I/Os is available. Fail-safe modules enable integration in safety-related systems with SIMATIC Safety Integrated using the PROFIsafe profile over PROFIBUS DP. The pin assignment for the actuators and sensors is modelled on the IP65/67 standardization trends.

Module range

Module	Basic modules						F-module	Connection blocks	
	8 DI	16 DI	8 DO (2 A)	16 DO (0.5 A)	8 DI/8 DO (2 A)	8 DI/8 DO (1.3 A)	4/8 F-DI	ECOFAST RS 485	M12, 7/8"
No. of IO channels	8/0	16/0	0/8	0/16	8/8	8/8	4/0[1)] 8/0[2)]		
Connections	8 x M12 cable glands (for 16 channels with dual assignment)							ECOFAST Cu	M12, 7/8"
Order No. group	6ES7141-3BF.	6ES7141-3BH.	6ES7142-3BF.	6ES7142-3BH.	6ES7143-3BH.	6ES7143-3BH.	6ES7148-3FA.	6ES7194-3AA.	6ES7194-3AA.

1) 2-channel for SIL3 sensors 2) 1-channel for SIL2 sensors

General technical data

Transmission rates	9.6 kbps to 12 Mbps
Voltage supply	24 V DC
Current input from load circuit 1, up to 55 °C	Up to 1 A (according to variant)
Current loading capability of the outputs per channel	0.5/1.3/2 A (according to variant)
Current input from load circuit 2, up to 55 °C, max.	8 A
Diagnostic function ■ Group fault display ■ Short-circuit (encoder supply) ■ Load voltage	 yes Module-by-module Module-by-module
Dimensions (W x H x D) in mm ■ Basic submodule ■ Basic module with ECOFAST ■ Basic module with M12, 7/8	 210 x 60 x 28 210 x 60 x 54 210 x 60 x 53

ET 200eco block IO

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SIMATIC ET 200R
The solution for robots in IP65

For the optimized solution of welding and handling applications in body-in-white assembly in the automobile industry, SIMATIC ET200R is ideal. The rugged construction with IP65 degree of protection in a cast aluminum casing can be used direct on the robot in environments with strong electromagnetic interference. Weld spatter is not a problem!

ET 200R for robots

The advantages of PROFIBUS are naturally integrated into the module

- Transmission rates up to 12 Mbit/s
- Troubleshooting with diagnostic message frames
- Extremely fast ramp-up times (optimized for tool replacement systems)

The I/O and repeater functionalities are integrated in the electronics. The integrated repeater functionality means that applications with tool changers can be mastered perfectly. PROFIBUS interruption on tool changeover on the second segment (downward segment) leaves the first segment completely unaffected thanks to the integrated galvanic isolation. The advantage of this is an increase in plant availability.

Setup

- PROFIBUS, the power supply, and analog signals are connected using 17-pin M23 connectors.
- The signals are looped through over a hybrid cable to further ET 200R modules through the 17-pin M23 connector. A plug-in terminal strip on the rear of the welding module supports easy start-up and rapid service.
- The pin assignment for the actuators and sensors is modelled on the IP65/67 standardization trends.
- The PROFIBUS address is set on two rotary coding switches accessible from the outside.
- The PROFIBUS address is set via two easily accessible M12 cable glands on the front face of the module.

As the terminating resistor is already implemented in an integral solution, there is no need for inspection of the terminating resistor on the last station. This reduces the number of hardware components on the robot.

Module range

The I/O offers up to 16 digital input channels. The 16DI can be transformed into 15DI/1DO, 14DI/2DO, etc., as far as 8DI/8DO with appropriate software parameterization.

In the case of the welding module, analog signals (SKÜ, KSR) from the welding transformer can also be connected to the rear of the module.

Module range	Order No. group
ET 200R-H (handling)	6ES7 143-2BH00.
ET 200R-W (welding)	6ES7 143-2BH50.

General technical data	
Number of channels	16 process channels 8 DI fixed 8 DI/DO parameterizable
Input characteristics	To IEC 61131, type 2
Voltage supply	24 V DC
Output current per channel	Max. 0.5 A
Total output current	2 A
Ambient temperature	55°C
Ramp-up time at 12 Mbaud	approx. 80 ms
Housing material	Cast aluminum
Diagnostic function Load voltage missing Short-circuit (encoder supply) Short-circuit of the digital outputs	Yes Group-by-group, XO Group-by-group
Dimensions (W x H x D) in mm	54 x 150 x 55

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Accessories for PROFIBUS

Bus test unit BT 200

The SIMATIC ET 200 I/O systems offer powerful, multi-level diagnostic systems within the framework of Totally Integrated Automation for faults that occur in the control system (system diagnostics). System faults are automatically detected and are caught by programmable exception handling routines. Furthermore, such system faults are signaled to the connected HMI system, and displayed there in an appropriate manner.

Bus test unit BT 200

In addition to system-wide diagnostics, PROFIBUS offers so-called bus diagnostics. Even before start-up, you can check bus cables, interfaces and the accessibility of components with the bus test unit BT 200 on PROFIBUS. The diagnostics repeater allows wiring to be checked during normal operation. The status of the connected stations and modules is monitored and indicated in plain text.

During startup and runtime, the automation system topology with the ET 200 stations is offered as overview diagnostics.

Diagnostic Repeater

Diagnostic Repeater

Module diagnostics provides more detailed information on the individual modules, and includes, for example, short-circuit testing of sensor power supply and outputs. Modules with diagnostic capability monitor each channel for short-circuit and wire-break. This makes it possible to react immediately to every irregularity and process event. The response of the controller can easily be programmed with STEP 7.

In addition to the system diagnostics, software tools are also available for process diagnostics in order to determine and eliminate faults outside the PLC.

FastConnect bus connection

The correct physical structure of the bus system is a basic requirement for fault-free plant operation. Since poorly assembled plugs are often the reason for plant down times, extreme care should be taken during installation.

The FastConnect system for PROFIBUS and PROFINET significantly supports and accelerates this work. Tools, bus cables and connectors which are easy to handle enable fault-free assembly within minutes:

- FastConnect stripping tool
- FastConnect standard bus cable
- FastConnect high-speed bus connector

With FastConnect, the RJ45 cabling system can be used as the existing standard.

The rugged sub-D connection system can also be used for direct connection of stations and network components.

FastConnect bus connector for fast and fault-free assembly

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Standards and approvals SIMATIC ET 200

Standards and approvals	
PROFIBUS	EN 50 170, Volume 2
PROFINET	IEC 61158
IEC 1131	IEC 1131, Part 2
UL	acc. to UL508 standard, File No. E 116536/E 75310 (AC modules)
CSA	Acc. to standard C22.2 No. 142. File No. LR 48323/LR 44226 (AC modules)
cULus (for hazardous locations)	acc. to UL 508 standard File No. E 116536 acc. to hazardous locations UL 1604 File no. E 222109 acc. to CSA C22.2 standard No. 142
FM	Standard Class No. 3611, Class I Div. 2, Group A, B, C, D Class I, Zone 2, Group IIC (without motor starter)
Shipbuilding	American Bureau of Shipping Bureau Veritas Det Norske Veritas Germanischer Lloyd Lloyds Register of Shipping Nippon Kaiji Kyokai
Ex approval Cat. 3 (for Zone 2 acc. to ATEX–100a)	EN 50 021

Additional information	
SIMATIC Controllers	6ZB5310-0ML01-0BA.
SIMATIC Technology	6ZB5310-0MN01-0BA.
SIMATIC Software	6ZB5310-0MM01-0BA.
Industrial Communication for Automation	6ZB5530-1AE01-0BA.
Explosion protection – fundamentals	6ZB5310-0LE01-0BA.
Safety Integrated for Factory Automation	6ZB5310-0NB01-0BA.
Safety Integrated for Process Automation	E86060-A4678-A181-.

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Degree of protection

Ingress Protection (IP) is a classification for degrees of protection which are defined in IEC 60529 and DIN 40050. The standards describe the classification of degrees of protection by means of housings for electrical equipment. They are used for operator protection and guard against the ingress of solids and liquids.

Nomenclature for degrees of protection

The IP degree of protection is classified using code letters and a two digit number. The higher the two numbers, the better the protection.

- The first IP digit represents protection against solid bodies. Foreign bodies of various particle sizes as far as dust are distinguished here.
- The second digit represents protection against water droplets that drip onto the connector from different angles, spray water, water jets and submersion of the connector in a liquid.

Protection against the ingress of solid bodies	Protection against the ingress of water		
1.	**2.**	**Brief description**	**Definition**
0		Not protected	
1		Protected against solid foreign bodies ≥ 50 mm	The object probe, sphere of 50 mm ∅ must not penetrate fully.
2		Protected against solid foreign bodies ≥ 12.5 mm	The object probe, sphere of 12.5 mm ∅ must not penetrate fully.
3		Protected against solid foreign bodies ≥ 2.5 mm	The object probe, sphere of 2.5 mm ∅ must not penetrate at all.
4		Protected against solid foreign bodies ≥ 1 mm	The object probe, sphere of 1 mm ∅ must not penetrate at all.
5		Dust protected	The ingress of dust cannot be totally prevented. The dust must not penetrate in such a quantity to affect satisfactory operation of the device or safety.
6		Dust-proof	No ingress of dust.
	0	Not protected	
	1	Protected against dripping water	Vertically falling drip water must not have a harmful effect.
	2	Protected against dripping water	Vertically falling drip water must not have a harmful effect when the housing is inclined at up to 15° from the vertical to either side.
	3	Protected against water spray	Water sprayed on both sides of the vertical at an angle of up to 60° must not have a harmful effect.
	4	Protected against splash water	Water spray from a hose which is directed on the enclosure must not have a harmful effect.
	5	Protected against water jets	A water jet from a hose which is directed on the enclosure must not have a harmful effect.
	6	Protected against intense water jets	An intense water jet from a hose which is directed on the enclosure must not have a harmful effect.
	7	Protected against harm from temporary submersion in water	Water must not enter in quantities that can cause damage when the casing is temporarily submerged in water under standardized pressure and time conditions.
	8	Protected against harm from long-term submersion in water	Water must not enter in quantities that can cause damage when the casing is submerged in water for a long time. The conditions must be agreed between the manufacturer and the user. The conditions must, however, be more severe than for 7.
	9	Protected against water from high-pressure hoses and steam cleaning	Water directed at extremely high pressure onto the enclosure from all directions must not result in harmful effects.

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References
SIMATIC ET 200S with PROFINET

**Peterstaler Mineralquellen, Germany –
Bottling of mineral water**

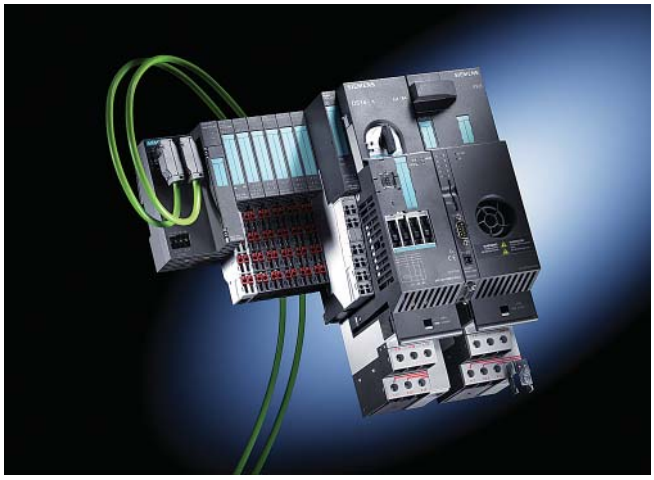
Requirements
Peterstaler Mineralquellen GmbH operates bottling plants at two sites in the Black Forest for their mineral water and non-alcoholic beverages. To improve the flexibility and capacity utilization of these two plants, they have been connected together using pipes in a project that is unique in this sector. Great emphasis was placed here on the communication between the two head stations and the substations along the route that had to be suitable for automation and telephone purposes.

Solution
The decision was in favor of an integrated, distributed solution using PROFINET. A single-mode fiber-optic network based on Ethernet (14 km distance) forms the backbone for the communication for the automation systems and the Voice-over-IP between the two sites. The mainstays of the automation solution are PROFINET-capable S7-300 controllers that are connected to the fiber-optic backbone via switches. The actuators and sensors of the field level (such as valve terminals) are connected to the integrated PROFINET interface via SIMATIC ET 200S distributed I/O devices.

Benefits
Thanks to the integral PROFINET functionality in the controllers of the S7-300 range as well as the SIMATIC ET 200S I/O, the automation devices could be directly connected to the Ethernet-based single-mode network. When programming with SIMATIC STEP 7, there is no distinction between accessing an I/O device such as SIMATIC ET 200S over PROFIBUS or PROFINET, so the expertise gained by the customer with PROFIBUS was safeguarded.

The important advantage of PROFINET over standard Ethernet according to the customer are the cycle times of between 5 ms and 10 ms that can be achieved over the real-time channel without which the extremely demanding closed-loop control tasks of this application would not have been possible over large distances.

"We are very satisfied with this solution: Transporting the mineral water over the hill has been problem-free since then. Transport by truck became unnecessary and this reduced the associated pollutant emission, which in turn was evaluated very positively in our current environment protection audit according to ISO 14001."
Wolfgang Sum, Manager



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SIMATIC ET 200S COMPACT

Meyer Burger AG, Switzerland –
Manufacturing and processing of materials

Requirements

Meyer Burger AG has over 50 years of experience in cutting hard and brittle materials and special crystals such as silicon and sapphire. The global sales and service network of Meyer Burger has a separate subsidiary in China and Japan as well as service centers in Germany and the Philippines. The main industries are the photovoltaic, semiconductor and optical and ceramics industries. More than 3,500 systems have been installed worldwide.

Hard and brittle materials have to be cut faster, more accurately and with less loss of material. This places stringent demands on the control system and the I/O: Compact size, fast response, reduced wiring outlay and modular construction of machines.

Solution

To meet these requirements, Meyer Burger relies on the compact distributed I/O ET 200S COMPACT. Thanks to their high channel density, it was not necessary to expand the stations. Add-on terminals were also used to enable 3-wire connection without the need for additional terminal blocks. This saves space and time during wiring up. The existing bus system was PROFIBUS DP, so this was also used for the new solution.

Benefits

The use of ET 200S COMPACT provides several benefits: The signals of the different sensors and switches can now be bundled and evaluated by the existing PROFIBUS. Complete preassembly (wiring) of the modules means that on final installation only the bus cable has to be connected. Time-consuming wiring of modules in the control cabinet is therefore reduced.

"By using ET 200S COMPACT, we can acquire control variables on our machines decentralized and transfer them to the controller over PROFIBUS. Fewer signals therefore have to be routed to the control cabinet. This reduces the wiring costs and increases our flexibility considerably. We can therefore reduce throughput time at final assembly."

Dr. Urs Schönholzer, Head of Development

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SIMATIC ET 200M

Turgai-Petroleum, Canada –
Remote control for oil production

Requirements

Turgai-Petroleum AG with headquarters in Kysyl-Orda is a joint venture between the Russian LUKOIL Overseas and the Canadian Petro Kazakhstan. LUKOIL is one of the leading worldwide corporations in the oil and gas sector and is mainly active in the exploration and production of oil and gas as well as the production and marketing of mineral oil products and petrochemicals. The capacity of their production plants in Russia alone is 41.8 million tons of oil per annum. Petro Kazakhstan is one of the 100 largest oil producers. The Canadian company that has specialized in oil-rich Kazakhstan produces 150,000 barrels per day and operates a refinery in this Central-Asian country.

Energotechservice GmbH with headquarters in Almaty, Siberia was tasked with the data acquisition and remote control of oil production. The focus here was on integration in the existing system and user-friendly features as well as their consistent further development. Further requirements included implementation of data transmission over wireless channels and integration in the existing Telemechanik system.

Solution

The automatic control system for the technological processes of the oil and gas sector is based on a system for telemetric data acquisition and remote control. For Turgai-Petroleum, 120 probes were optimized using automation.

Due to the environmental conditions, SIMATIC ET 200M modules for use in hazardous areas were used. They are of a particularly rugged and intrinsically-safe construction. This I/O is based on the same principle as the S7 controllers, so it interacts well with the SIMATIC S7-300 components used.

Benefits

Due to the modular structure of ET 200M, the application was implemented with the smallest possible number of components. The redundant structure and the ability to make changes to the configuration during normal operation has increased the availability of the plant significantly. Modules can now be replaced during normal operation and downtimes are reduced to a minimum. By using STEP 7, 50 to 70% of the engineering costs could be saved. Overall, the stability of the process and the productivity has significantly increased. Drives can now be easily controlled, either remotely or locally as required.

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SIMATIC ET 200iSP

Norr Systems, Singapore –
Cargo and ballast system

Requirements

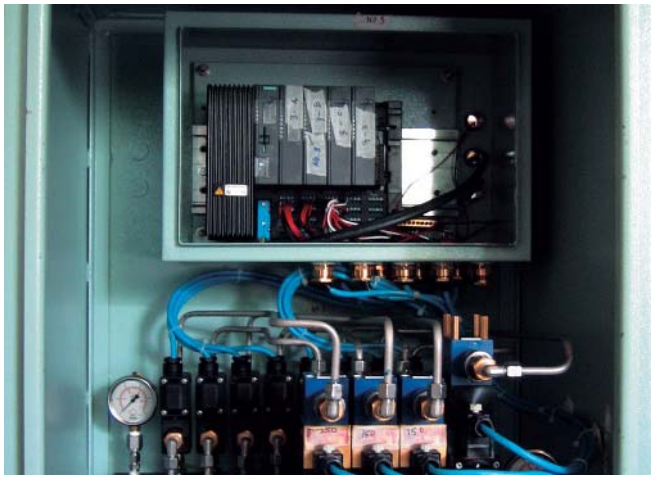
Loading and offloading of liquid cargo for Tanker always is a challenge. Emphasis on safety is paramount importance of all aspect. Especially for dangerous and flammable cargo, proper loading and offloading procedure is important role for Cargo Master. As such, Valve Control became most important systems in cargo load distribution. The Valve Control system must equip with reliable design and components used. Any failure of this system could be resulted undesirable consequences on both Vessel and Human safety.

Solution

NORR SYSTEMS had developed a good design on using High / Low Hydraulic Valve Control Systems integrated with Siemens Automatic Product. From mechanical aspect, the low pressure IS solenoid valve provided good solution for better reliability (Oil cleanliness is less stringent compare to high pressure solenoid valve) and easy maintenance. As from Electrical aspect, Siemens PLC provide good fit on both IS distributed I/O (ET 200iSP) and PROFIBUS provide good solution to provide communication between Hazardous areas (zone 1) and safe areas. Since, the electrical command and feedback signals for controlling the valve are via PPROFIBUS. Shipyard installation work is minimize and the specify software programming can build in many additional fault diagnostic functions for the entire systems. More importantly, the number of component used on the whole systems had reduced (due to Siemens Solution) and the entire system reliability is higher and better.

Benefits

The principle benefit of this Integrated Hydraulic High / Low valve Control systems is entirely suit the customers specify needs on both "user friendly and easy maintenance". The Siemens ET 200iSP provide extreme simplified design communication between Hazardous area and safe areas and zener barrier was no longer needed. The customer feels very comfortable on this system, while this system still helping the vessel crew for Loading / Offloading of cargo in one of the offshore oil field.



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SIMATIC ET 200pro mit Safety Integrated und PROFINET

**Volkswagen Nutzfahrzeuge, Germany –
Vibrating roller test bed**

Requirements

Volkswagen Nutzfahrzeuge (VWN), an autonomous brand of the Volkswagen corporation has installed the final noise test in the transporter works in Hanover in the workshop hall. Now the commercial vehicle business is operating a vibrating roller test bed in its works in Hanover in cooperation with the "Automation Initiative of the German Automotive Industry" (AIDA).

The customer's requirements were extensive: The vibrating roller test bed had to be linked into the existing network structure (PROFINET); fail-safe communication was just as important as a reduction in training costs. The use of distributed I/O was also demanded.

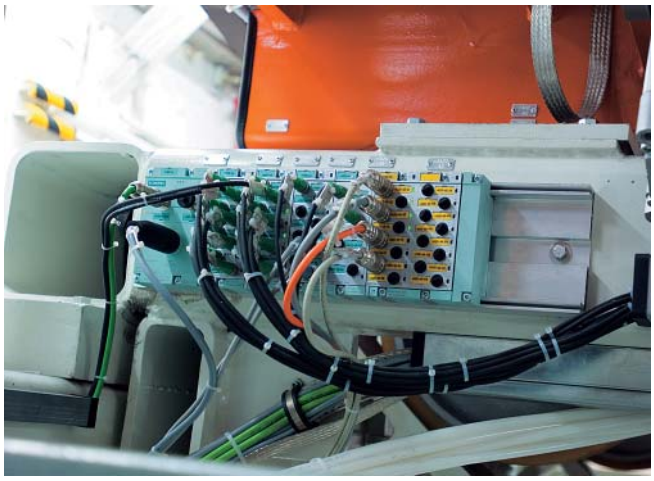
Solution

The distributed I/O had to be installed in the support structure of the test bed, in a compact space, close to the vibration dampers. The only solution was, therefore, a cabinet-free solution of extremely high ruggedness and industrial compatibility which is why SIMATIC ET 200pro was used.

An S7-400F controller was used which ensured fail-safe communication over PROFINET. Apart from SIMATIC ET 200pro outside the control cabinet, SIMATIC ET 200S was also used as distributed I/O but this was installed alongside the controller in the control cabinet. Both distributed I/O systems are in a standard but fail-safe configuration. A PROFINET-capable SCALANCE X208pro Switch to the IP65 degree of protection distributes incoming and outgoing data.

Benefits

Use of SIMATIC ET 200pro resulted in a number of advantages: Costs were saved thanks to standardization and optimization of the spare parts inventory. The reduction in training costs for maintenance and service personnel was also satisfied. Due to the ability to exchange electronic modules during operation - so-called hot swapping - high availability was achieved for the plant. There was also a reduction in the installation and wiring costs for the safety-related part of the plant.



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SIMATIC ET 200eco

Veronesi, Italy –
Animal feed manufacturer modernizes basic materials infeed

Requirements

One of the largest European manufacturers of animal feeds, Veronesi S.p.A, Italy, was looking for an efficient solution for modernized automation of their basic materials infeed. Materials infeed is the critical point in production for the animal feed manufacturer. If the flow of materials stops, the entire plant is at a standstill, so it was important to ensure that production continued. The safety regulations for installations in a dust-filled atmosphere must also be satisfied. The greatest challenge, however, was presented by selection of the technical configuration: All sensors and actuators had to be connected to the distributed I/O over the shortest possible connections; this demanded a cabinet-free configuration.

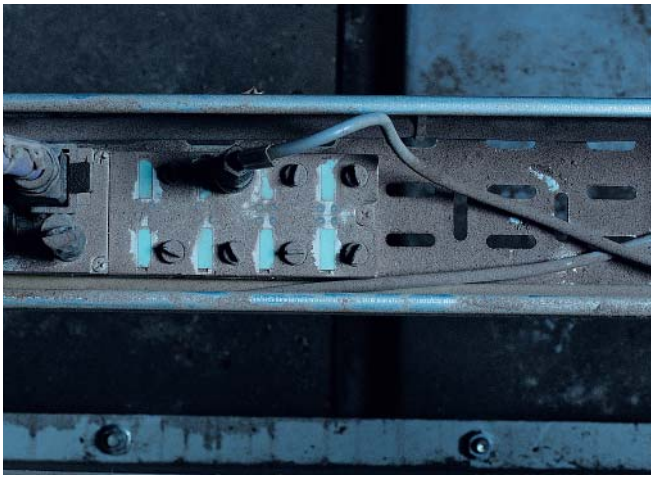
Solution

The Swiss system integrator ASE-Bühler AG developed the new plant concept – taking the plant philosophy at Veronesi into consideration: all plant sections are divided into individual sectors. The materials infeed too. This was automated by means of a SIMATIC S7-400 controller. It replaced the aging relay control. The special feature of the new plant is the PROFIBUS architecture. Four PROFIBUS lines run from the S7-400 PLC into the concrete towers containing the silos. A total of 150 SIMATIC ET 200eco stations are connected to the four bus lines which were installed without a cabinet directly in the plant. Control boxes were only required for the repeaters that were installed to support PROFIBUS branches. The connections were implemented using the standardized ECOFAST system with data and power supplied along the same cable.

Benefits

Commissioning of the fully automated complete solution was problem-free and implementation was possible during normal operation of the plant. The wiring over the ECOFAST connections was extremely easy, so the retrofit was completed quickly. The new solution supported a cost-saving bus architecture with cabinet-free distributed I/O as well as increased transparency in the automation system.

Since the entire solution originates from Siemens, the cost of training the maintenance personnel has been reduced. In the event of a failure, only one contact partner needs to be contacted at Siemens.



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Further information can be found on the Internet

Distributed I/O:
www.siemens.com/et200

Totally Integrated Automation:
www.siemens.com/totally-integrated-automation

SIPLUS extreme – Hardening and Finishing:
www.siemens.com/siplus

Service & Support:
www.siemens.com/automation/service&support

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Automation and Drives
Industrial Automation Systems
Postfach 4848
90327 NÜRNBERG
GERMANY

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